The Illinois Dental Journal

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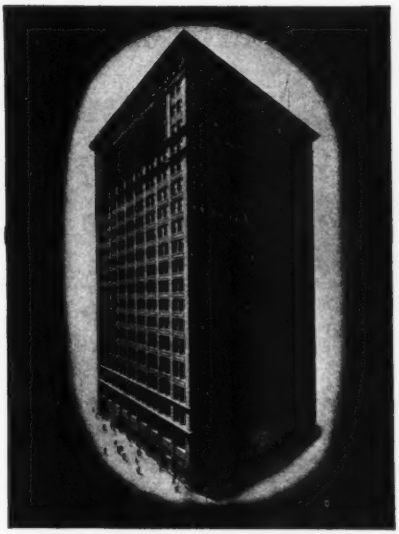

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Published monthly by The Illinois State Dental Society under the direction of the Publication Committee. Entered as second-class matter at the post office at La Grange, Illinois, under Act of March 3, 1879. Subscription price of this Journal to persons not members of the Illinois State Dental Society is $2.00 per year, in advance, postage prepaid, for the United States, Cuba, Porto Rico, Philippine Islands, Hawaiian Islands and Mexico. $2.50 per year for all foreign countries included in the Postal Union. Canada, $2.25. Single current copies, 25 cents.

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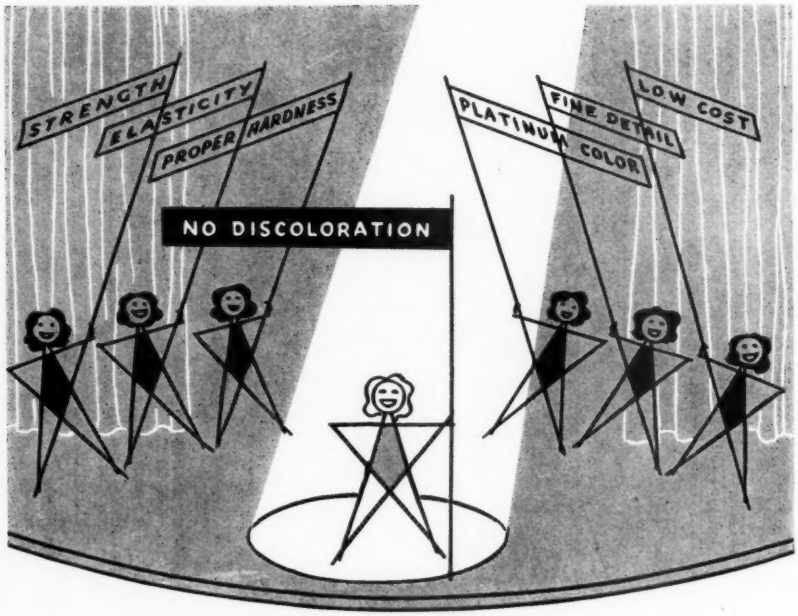

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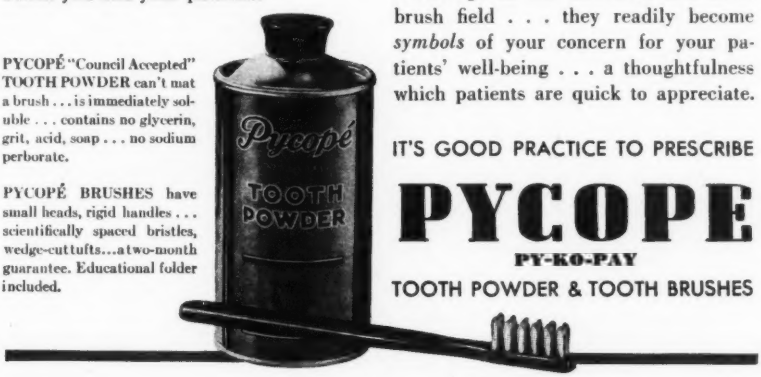

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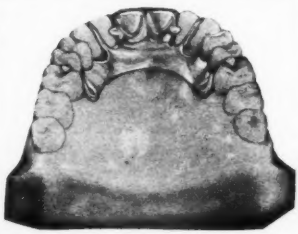

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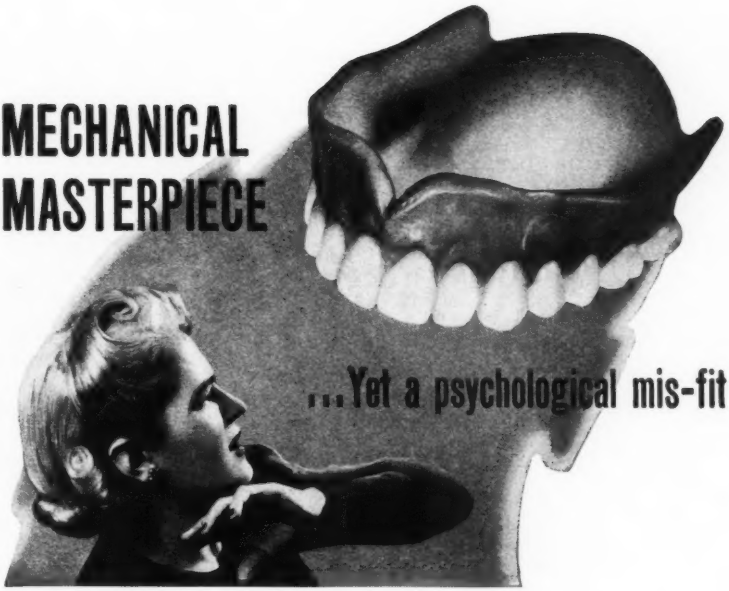

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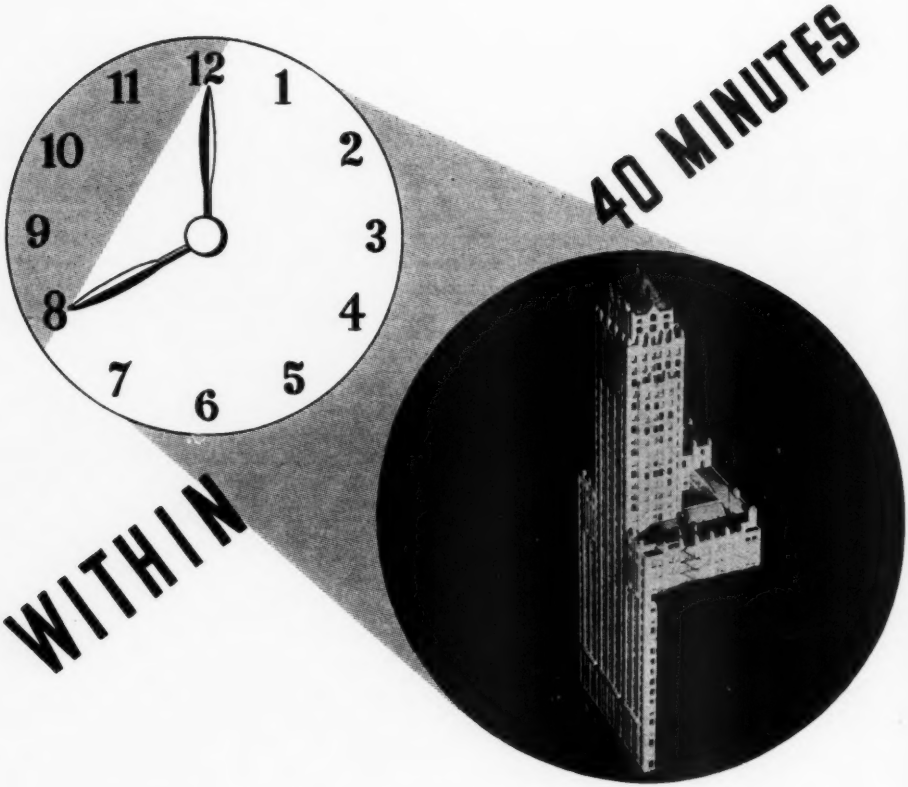

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VOLUME 9 May, 1940 NUMBER 5

JOHN WILLIAM GLUESING, D.D.S.
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(*Story on Page* 184)

V 9 5 MAY 40 XUM

BILATERAL CONDYLECTOMY IN A PATIENT WITH MULTIPLE FRACTURES OF THE MANDIBLE*

By ARTHUR E. SMITH, M.D., D.D.S.,
and JAMES B. JOHNSON, M.D.

PRIOR TO THE ADVENT of the automobile and modern sports a fracture of the mandibular condyle was comparatively rare. Now they occur with such frequence and with such complications that this subject merits careful consideration. Modern textbooks on surgery and the medical literature contain very little subject matter on this type of fracture. The object of this paper is to report a patient with several fractures of the mandible including both condyles, further complicated by dislocations. We feel that this should be of interest to both the oral surgeon and the prosthodontist. A study of the medical literature has been carefully made and to the best of our knowledge we believe this case to be the first bilateral condylectomy reported. We welcome correspondence from any surgeon who may have reported a similar experience.

ANATOMICAL FACTORS GOVERNING MOVEMENTS OF MANDIBLE

In order to familiarize ourselves with this problem, a brief discussion of the anatomical factors controlling mandibular stabilization and movement is justified. The mandible is composed of a body and the two rami. The body is composed of two symmetrical halves supporting the teeth and united in the mid-line to form the symphysis and chin. The upper extremity of each ramus consists of a condyle and a coronoid process separated by the sigmoid notch. The head of the condyle articulates in the glenoid fossa of the temporal bone, thereby creating a compound joint, classified technically as an arthrodial diarthrosis. The mandible is the only bone of the skull that is movable. By virtue of its location and prominence the mandible not only acts as a protecting guard to the face, but it is subjected to more violence than other bones of the skull. The mandible is freely movable, evenly balanced and is stabilized by the condylar heads in the glenoid fossae. Its movements are controlled by two opposing sets of muscles, viz., the elevators and the depressors. During normal mandibular movements these muscles coördinate in perfect harmony. Each muscle has its function to perform and so long as muscular action is normal the mandible will glide through its many movements with perfect ease. However, this ease of gliding movements, actuated by muscular coördination and perfect balance, is easily "wrecked" by dissolution of bone continuity. The elevator group of muscles of the mandible consists of the temporal, masseter, external and internal pterygoid. The depressor group is: geniohyoid, geniohyoglossus, digastric, mylohyoid and platysma muscles. The temporomandibular articulation is composed of the head of the condyle, glenoid fossa and the meniscus composed of fibrocartilage with the capsular membrane. These structures form the compound joint. The socket is bounded anteriorly by the articular eminence and posteriorly by the Glaserian fissure and tympanic plate. The mandibular movements are also partially controlled by the sphenomandibular and stylomandibular liga-

*Presented by Dr. Smith before the Oral Surgery Section of Midwinter Meeting of the Chicago Dental Society, February 16, 1939.

The authors wish to express appreciation to Dr. E. Eric Larson for his surgical cooperation and to Dr. Karl Bonoff for his radiological aid.

ments. The temporomandibular ligament is also part of the joint capsule. The anatomical structures of the temporomandibular joint and the muscular suspension of the lower jaw permit a greater number of more varied movements than any other joint or bone in the body. The mandible can be elevated, depressed, retracted or extended. It can be rotated or moved from side to side. Muscle coördination with perfect functional balance makes possible the gliding masticatory movements.

The surgeon should possess a thorough knowledge of the foregoing factors and must familiarize himself with normal intermaxillary relation, occlusion and applied mechanics before assuming the responsibility in cases of mandibular fracture, if he is to avoid the stigma of unsatisfactory end results.

Bone Fragment Displacement

The displacement of one or more broken fragments is dependent upon their location, the position of the fractured ends, the muscles involved and the extent of the soft tissue laceration. The classification is very broad and there are numerous anatomical factors which enter into the problem of each mandibular fracture. The surgeon who is familiar with the origin and insertion of the elevator and depressor groups of muscles and the direction of normal muscle pull will have little difficulty in solving the problem.

Traumatic fractures of the lower jaw are caused either by direct or indirect violence (contra coup) or both. The location and extent of damage to the mandible depend upon the following factors: (1) The location of the impact; (2) The direction of the force; (3) The severity of the force; and (4) The relationship between the upper and the lower teeth at the time of impact, (a) Mouth open; (b) Mouth closed.

The location, direction and force of the impact are the basic factors involved in mandibular fractures. For example: if the impact is delivered on the chin in the mid-line and if the force is equal bilaterally backward and of sufficient intensity, the symphysis as well as both condyles and coronoid processes may be fractured. If the teeth are in occlusion one or more teeth may be dislodged or lost and some of the cusps may be severed. In addition, the upper jaw may be fractured or a section of the alveolar process may become separated. The upper jaw and teeth may escape injury providing the mouth is open. However, should the impact be delivered over the mental foramen causing a fracture, with the line of force directed laterally and backward, the condyle on the opposite side may be fractured and the other condyle dislocated. One fracture may be through the condyle on one side with a fracture through the symphysis or angle of the ramus on the other side. The impact, however, may cause only a fracture at the neck of the condyle but if the force is of sufficient intensity the head of the condyle may be torn from its socket. Usually condyle fractures are accompanied by one or more mandibular fractures.

Position of Condyle Fragment Without Dislocation

The position and location of the lower end of the condyle fragment without dislocation is dependent upon direction of fracture, the intensity and the direction of force of the impact. The condyle fragment may assume therefore the following positions:

(1) When the structures composing the mandibular joint are not injured, the head of the condyle remains in the socket. There will be no displacement of the lower end of the fragment, providing the fracture through the neck of the condyle is transverse.

(2) If the mandibular joint is intact with an oblique fracture of the neck of the condyle the lower end of the frag-

ment may be displaced mesially, laterally, anteriorly or posteriorly.

(3) With mesial, lateral, anterior or posterior displacement, the lower end of the upper fragment usually over-rides the lower fragment.

CONDYLE FRACTURE ACCOMPANIED BY DISLOCATION

The position of the condyle fragment is dependent upon the direction and the intensity of the force of the impact. When the fractured condyle is torn from its socket, joint tissue laceration with bleeding resulting in a hematoma, is produced. If the backward force is bilaterally equal and is of sufficient intensity, the fractured condyles may be stripped of their investing tissues. The condyle head is usually located anteriorly and the broken end posteriorly. The head of the condyle will be displaced mesially and anteriorly by the pull of the external pterygoid providing its insertion remains intact. Lateral displacement of the head infrequently happens, due to protection from the posterior portion of the zygoma. Usually in anterior, mesial or lateral displacement the condyle fragment may assume a horizontal position.

DISPLACEMENT OF LOWER FRAGMENT

When both condyles are fractured transversely through their necks with no dislocation the lower jaw will assume its normal position and occlusal relationship. If, however, the fractures are oblique through the necks of the condyle the mandible will be in moderate retrusion accompanied by a slightly open bite. Condylar fractures complicated by dislocation and torn investing joint tissues of the mandible will result in a retrusion of approximately 1 cm. with a pronounced open bite and an abnormal occlusion. With the fracture of only one condyle and with dislocation, the mandible will deviate towards the affected side and malocclusion will be present, the degree depending upon the amount of displacement. Excursion of the jaw toward the affected side will be noted when the mouth is opened.

X-RAY EXAMINATION

The treatment of mandibular fractures without thorough x-ray examination is unwise. This examination should include not only the side upon which the impact is received, but also the opposite side. A thorough x-ray examination includes the following: right and left lateral stereoscopic views to show the rami and condyles; a posterior anterior view of the superior maxilla; an intraoral bite film and stereoscopic vertex projections of the temporomandibular articulations as well as extra films at odd angles or dental films for localized areas. Adherence to this routine will provide an accurate diagnosis as a prelude to adequate treatment.

TREATMENT

Fractures of the mandible often present problems which may be different with each case and which are sometimes extremely difficult to manage. Multiple and compound fractures and those complicated with soft tissue injury require careful study and diligent early care. The treatment is dependent upon:

(1) The location of the fractures.

(2) The position of the bone fragments.

(3) The damage to surrounding structures.

(4) The presence or absence of certain teeth in the upper and lower jaws.

(5) The edentulous mouth.

The following are methods of reduction:

(1) Intermaxillary wiring.

(2) Interdental splints. (Form fitting cast arch bars to buccal and labial surfaces of teeth.)

(3) External manipulation.

(4) Direct wiring by open reduction. (Wires should be avoided if possible.)

(5) Other surgical procedures.

(6) A combination of two or more of the above methods may be necessary.

The treatment of the many types of mandibular fractures, some of which have just been mentioned with their many combinations and complications, is beyond the scope of this paper. We will therefore limit ourselves to the discussion of fractures of the condyle.

Treatment of Condyle Fractures Without Dislocation

If the condyles are fractured at their necks with no bone fragment displacement, immobilization is accomplished by intermaxillary wiring. Usually four to six weeks is a sufficient period for the immobilization. This is also true of unilateral fractures of the same type. When the lower end of the broken fragment is displaced posteriorly, mesially or anteriorly, and is in contact with the lower fragment, we believe that bony union will result. Intermaxillary wiring is the treatment of choice in these conditions. If the lower end of the upper fragment is lateral to the lower fragment, reduction may be accomplished by manipulation under general anesthesia. Over-riding and wide separation of the fragments provide a situation wherein more radical treatment such as open reduction may be advisable. The age of the patient and the condition of the teeth should be considered. Bilateral condylar fractures with fragment separation is far more serious than unilateral involvement, because with the latter, condylar stabilization on one side has not been destroyed. Whether the treatment is by open reduction with intermaxillary wiring or by the employment of intermaxillary wiring alone depends upon the individual case. We have treated these fractures by both procedures but we have been careful in the selection of the method. Our results in re-establishing normal intermaxillary relation and occlusion have been very satisfactory.

Treatment of Condyle Fractures With Dislocation

Separation of the condyle head from its socket with the fragment assuming a horizontal position indicates that the capsular investing tissues have been lacerated and usually a hematoma is present in the surrounding tissues. The fragment may be stripped of its investing tissues including the insertion of the external pterygoid muscle. If the injury is unilateral, the lower jaw will assume a lateral position. The lower fragment is pulled backward and upward into the region of the socket. When the injury is bilateral the mandible is in retrusion, with both lower fragments pulled upward and backward into the sockets. Open bite and abnormal occlusion exist. We believe that in such severe instances condylectomy is indicated. We believe further that reduction of the fractures by replacing the heads of the condyles in their sockets is contra-indicated, because in all probability a partial or complete ankylosis would result. The denuded and horizontally located condyles when not removed but allowed to remain in

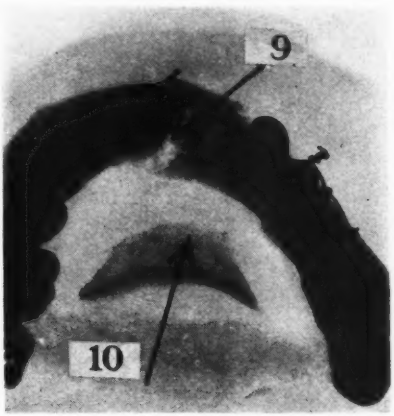

Figure 1
X-ray illustrating broken fragment in floor of the mouth, as shown at 10. Fracture in right incisor region shown at 9.

the hematomatous mass will result in connective tissue formation. When treatment consists only of intermaxillary wiring in these severe cases the post-operative result may be very discouraging, because in all probability normal mandibular movements will not be secured, due to the abnormal position of the condyles and to the formation of connective tissue and callus. Good treatment should result in normal mandibular movements and occlusion with facial symmetry.

We believe that in severe cases, when all the phases of this problem are considered, the best results will be obtained from condylectomy and intermaxillary wiring. Condylectomy with intermaxillary immobilization is followed by the application of intermaxillary elastics, accomplished by form-fitting cast splints applied only to the buccal and labial surfaces of the teeth. These splints must not interfere with occlusion.

CASE REPORT

M. B., white, female, age 19, single: The patient consulted us on May 20th, 1935, one week following an automobile accident in which she suffered multiple fractures of the lower jaw with contusions about the face and cerebral concussion. She had been confined to the hospital for five days immediately following her injury. No reduction of the fractures had been attempted with the exception of the application of a Barton bandage and one intermaxillary wire.

The chief complaint was of pain in the region of both temporomandibular joints and in the region of the symphysis, which was exaggerated on palpation or attempted motion. The patient had experienced, for two days previously, a very bad taste and she had noticed considerable pus exuding from the region of the symphysis. No x-rays had been taken prior to our examination.

The examination revealed numerous contused and ecchymotic areas about the face, eyelids and lips, with a moderate edema in both cheeks. The right lower lateral incisor was missing and the socket contained pus. The mucous membrane on both labial and lingual sides was lacerated and ruptured in the region of the symphysis. A foul purulent discharge was escaping from the deeper tissues. The tissues comprising the floor of the mouth showed marked induration, which extended beneath the symphysis. Both submaxillary glands

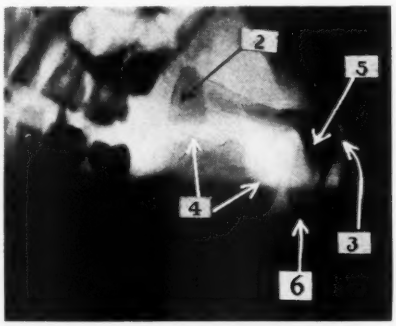

Figure 2

Right side. Lateral x-ray showing fractures and dislocation. The coronoid process indicated at 2 is separated from its base. The glenoid fossa is indicated by arrow at 3. The fractured and dislocated condyle is inverted; its fractured neck is indicated at 5; the condyle head at 6. The lower end of the condyle fragment assumes a posterior mesial position over-riding upper end of the fractured ramus.

were palpable and tender. The lower jaw was approximately 1 cm. in retrusion. Manipulation of the right and left sides of the mandible disclosed the parts to be very mobile. It was impossible to occlude the lower teeth to the upper arch. The teeth on each side were lingually inclined with the lower border of the mandible tipped outward.

Posterior, anterior and occlusal x-rays of the lower jaw revealed a compound fracture of the symphysis of the mandible with an additional fracture of the lingual plate including the genial tubercles. The bone fragment was dis-

placed 3½ cms. posteriorly in the floor of the mouth. (See Fig. 1). Stereoscopic x-rays disclosed that the heads of both condyles were torn from their sockets. The right condyle was fractured, dislocated and completely inverted; the coronoid process was fractured and separated from its base. (See Fig. 2). On the left side the fractured condyle was displaced downward, dislocated and rotated. (See Fig. 3). An anteroposterior x-ray of the superior maxillary showed no fracture.

CONSULTATION: After studying the x-rays and completing the clinical examination, the seriousness of the case was apparent. The patient was a beautiful young woman possessing a receding mandible broken into six pieces. The temporomandibular joints were destroyed, the condyles were fractured and dislocated. One coronoid process was broken and the fragments were

Figure 3

Left side. Lateral x-ray showing fractured, dislocated and rotated condyle. It was displaced laterally and downward. Glenoid fossa shown by arrow at 7. The condyle head was located 1½ cm. anterior and below the socket. The fractured lower end of the condyle is indicated at 8 and was displaced laterally, posteriorly and downward. The upper end of the fractured ramus is shown at 6.

separated, with a compound fracture through the symphysis, and a piece of bone separated and forced backward beneath the tongue. She had an open bite, and very mobile and diverging mandibular fragments. The question of retaining the condyle fragments which might later be followed by partial ankylosis was considered. Condylectomy was debated which might result in a permanent retrusion of the mandible, accompanied by an open bite and abnormal occlusion. We consulted with two nationally known prosthodontists, Drs. M. M. House, of Whittier, California, and John B. LaDue, of Chicago, to discuss the prosthetic aspect. After considerable deliberation it was agreed that a bilateral condylectomy be done.

SURGERY: BILATERAL CONDYLECTOMY. Three days later, which was ten days following the accident, the patient was admitted to the hospital for surgery. On the left side, a perpendicular 3 cm. incision was made through the skin just anterior to the ear. Blunt dissection was used thereafter. When the posterior portion of the masseter muscle was divided along the lower surface of the zygoma, a hematoma was encountered. The condyle was found to be almost completely detached. The head of the condyle was located 1½ cms. anterior and below the glenoid fossa. The neck of the condyle was directed posteriorly and mesially, and was over-riding the lower fragment. (See Fig. 3). The external pterygoid muscle was entirely detached and the head of the condyle was devoid of the meniscus and capsular ligament. The condyle was literally picked out of the hematomatous area.

The pre-accident buccal position of the left lower teeth was corrected by placing the teeth in normal occlusion. (See 12 and 13, Fig. 4). Note the space created by the two lower incisor teeth which were lost in the accident. The fracture in the lower left incisor region and the fractured condyle made possible the creation of normal occlusion on the left side of arch.

On the right side, a 3 cm. perpendicular incision was made through the skin just anterior to the ear. The subdermal

tissues were divided by blunt dissection. When the fascia and muscle tissues were divided, approximately 10 ccs. of dark blood escaped under pressure from the region of the temporomandibular joint. The fractured condyle was found completely inverted. The fractured neck was in the glenoid fossa with the condyle head in a downward, posterior mesial position. The meniscus, capsular ligament and external pterygoid muscles were torn from the bone. (See Fig. 2). The condyle was easily removed and was found to be entirely void of soft tissue.

Four days following bilateral condylectomy, a second operation was done which consisted of: (1) An open reduction of the fracture through the symphysis; (2) The removal of the broken fragment; and the immobilization of the right and left mandibular segments by adjustment of silver splints to buccal and labial surfaces of teeth combined

Figure 4

Illustrating models and their use in determining certain technical procedures. Due to the abnormal position of the "shattered" mandibular fragments, two sectional impressions were made. Model 11 was made from the right impression; Model 12 from left impression. Model 13 of upper arch was mounted on articulator and the lower sectional models 11 and 12 were occcluded with the upper model. This was done to obtain correct wax impression of buccal and labial surfaces of teeth for making silver splints. Difficulty was experienced in articulating the lower left model (indicated at 12) with the model of the upper arch. Close examination proved that this patient possessed abnormal occlusion on the left side before her accident. The left lower teeth were buccal to normal. The lower left model was mounted on the articulator in a normal position to the upper teeth as shown at 13. Model 14 shows occlusal view of teeth and splint. Model 16 shows splint in position and articulation with upper model 15. Note the small bolt connecting the two halves as indicated by arrow. The teeth are in normal occlusion.

with intermaxillary wiring. A 3½ cm. curved incision was made through the tissues below the chin to expose the fracture line and the lower border of the symphysis. The fractured ends of the bone assumed an inverted V-position which was due to muscle contraction. The lateral halves of the mandible were tipped laterally which placed the teeth in a lingual position. The section of bone, which was separated from the lower border of the symphysis and had been forced 3½ cms. posteriorly through the floor of the mouth beneath the tongue, was removed. (See 10, Fig. 1). The two mandibular fragments were very mobile. The teeth were brought into occlusion and intermaxillary wires inserted. In order to retain approximation of the fragments at the lower end of the symphysis and to correct the divergence of the lower borders of the mandibular fragments, (very much against our desire) it was necessary to do a stainless steel wire ligation. The wire was removed two weeks later to prevent sequestrum formation. A small bolt was inserted to connect the two halves of the silver splint. (See 14 and 16, Fig. 4). The intermaxillary wires were adjusted and the bolt tightened. The teeth were in excellent occlusion. The metal splint was constructed to preclude interference with occlusion. (See 14, 15 and 16, Fig. 4.). This mechanical construction, consisting of cast silver splints and stainless steel wire ligation and intermaxillary wiring, efficiently immobilized the broken jaw fragments and restored pre-injury occlusion.

The patient was discharged from the hospital in one week and made an uneventful recovery. The intermaxillary wires were removed after eight weeks. Within a few hours after their removal, the lower jaw was in five millimeter retrusion. Models were then made from new impressions of the upper and lower arches. Castings from silver were made to cover the buccal and labial surfaces of the upper and lower teeth. Hooks were attached to the upper arch bar in the region of the cuspid and to the lower arch in the area of the second molar. These form-fitting cast appliances were fastened to the teeth with stainless steel wire. The hooks were connected by

Figures 5 and 6

Figure 5 (top) illustrates the application of the cast arch bars and intermaxillary rubber bands.

Figure 6 (bottom) shows occlusion of teeth fourteen months following surgery and six months following treatment with intermaxillary tension. Mechanical treatment was given for eight months.

rubber bands to create forward elastic tension which prevented retrusion of the lower jaw until nature produced a more resistant buffer defense to compensate for the lost condyle. (See Fig. 5). The result obtained from the elastic tension was closely observed until the five millimeter retrusion (which followed removal of the intermaxillary ligation) was corrected, then a constant elastic tension was maintained continuously for eight months, after which time treatment was discontinued. Normal intermaxillary relation and occlusion were accomplished and have remained so to date. (See Fig. 6).

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BACTERIOLOGIC VERIFICATION OF ROENTGENOGRAPHIC FINDINGS IN PULP INVOLVED TEETH*

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ONE OF THE GREATEST weaknesses in the field of operative dentistry today lies in errors in diagnoses and the unwarranted sacrifice of teeth because of misinterpretation of roentgenographic evidence. The all too prevalent concept of many practitioners that, each and every radiolucent area about the periapical region of a tooth is a definite indication of infection, is wholly unsupported by factual evidence.

Roentgenographic technic and interpretation, even in the hands of fairly skillful operators, in no sense measure up to the accuracy or sensitivity of a bacterial culture. Furthermore, many factors may be involved in determining the exact status of the circulation of the blood within a tooth. It should be remembered that the capillaries of the pulp tissue are terminal endings of the dental artery supplying it. Any injuries to the tooth as a result of disease processes or dental operative procedures, will in turn be transmitted through the dentinal tubules to the pulp tissue and its capillaries. If bacteria have invaded the pulp, the circulating blood in the capillaries may carry bacterial products out into the general circulation for a time before an actual breakdown of the capillary wall takes place. Consequently a vital, infected pulp may act as a source of systemic infection or allergic reaction before it can be recognized as such by any pulp tests or roentgenographic evidence of periapical disturbances. Since the periapical regions of bone are apt to undergo changes in architecture as a result of circulatory disturbances within the dental pulp, it would be helpful, if by their roentgenographic appearance, we could determine the presence of organisms responsible for their existence without sacrificing the tooth in the effort.

To understand the significance of various types of radiolucent and radiopaque shadows about root ends, we first must be familiar with normal variations in bone architecture. Simpson[1] describes seven characteristic forms of normal trabecular arrangement, ranging from alveolar bone with abundant uniform cancellations and exceptionally small medullary spaces to alveolar bone in which the trabeculae are widely separated with large medullary spaces. It is quite obvious that a given roentgen exposure in the first type of bone would have to penetrate a greater density per unit area, and consequently register with a lighter index of illumination on the photographic negative, than would be obtainable in a bone with large medullary spaces and thin trabeculae. Furthermore, the degree of radiolucency in bone having a loosely woven architecture may be far greater than that found in beginning bone resorption in a

*Presented before a meeting of the Odontographic Society of Chicago, December 11, 1939.

1. Simpson, Clarence O.: Advanced Radiodontic Interpretation. St. Louis University Press. 1931, pp. 52-53.

type having heavy trabeculae and small medullary spaces.

Factors Influencing Bone Resorption

The resorption of bone such as is frequently found in the periapical region of teeth in which pulp disturbances have occurred may be brought about by various factors. For a better understanding of the mechanism of resorption, our attention is drawn to some facts concerning bone changes as laid down by Dr. Greig[2] of Edinburg, Scotland. He states the following general principles:

"1. Maintain the circulation within certain limits and bone remains unchanged.

"2. Produce a definite hyperaemia and bone undergoes rarefaction, decalcification and osteoporosis.

"3. Restrict the blood supply and bone undergoes consolidation, increased density and osteosclerosis.

"4. Cut off the blood supply and bone undergoes necrosis."

These facts have been well substantiated by the excellent work of Harold Keith Box[3] of Toronto, Canada, in which he demonstrated extensive resorption of trabeculae on the side facing red bone marrow rich in red blood cells and no resorption of the same trabeculae on the side facing yellow or fatty marrow.

Box sectioned 100 blocks of tissue removed from human jaws to determine the frequency of distribution of red bone marrow. Yellow bone marrow was noted in 75 blocks. Definite zones of red bone marrow were present in 20 blocks in all age groups from 25 to 65 years. In the majority of cases, the presence of red marrow appeared to be focal in nature and the zones varied greatly in extent. Several examples were found in and above the maxillary tuberosity. Other examples were noted in the bone around upper and lower molars and bicuspids. One example was seen in the bone associated with an upper cuspid but no examples were found about the upper or lower lateral and central incisors.

Box suggests the hypothesis that certain zones of rarefaction as revealed in roentgenograms of the jaws, diagnosed as chronic osteitis and known as so-called "residual infection" may be found to be adaptive enlargements of the medullary cavities to accommodate the proliferated and expanded marrow.

A similar condition is frequently encountered in periapical resorption of bone following the removal of a preexisting hyperaemic pulp or in which certain forms of iodine have been employed in treatment. It is not uncommon to find a tooth in which the periapical tissue appears perfectly normal prior to pulpectomy or treatment, and at the time the final x-ray is taken after filling canals to find definite evidence of bone resorption, without infection ever having been demonstrated.

Leriche and Policard,[4] probably recognized as the leading authorities on bone metabolism, point out that bone resorption may occur by osteolysis, a process by which the phospho-calcareous complex disappears without cells participating in the process. The bone simply "breaks down" leaving connective tissue framework in its place. On the other hand, bone resorption may be caused by osteoclasis, in which the existing bone cells may be converted into phagocytic cells, the osteoclasts. These authors also point out the signs of bone resorption as follows:

"(a) 1. Peripheral resorption of trabeculae.

2. Enlargement of medullary spaces (spongy bone).

2. Greig, D. M.: Clinical Observations on the Surgical Pathology of Bone. Edinburgh, Oliver and Boyd. 1931, p. 7.

3. Box, H. K.: Red Bone Marrow in Human Jaws. Can. Dent. Res. Found., Bul. 20, 1933.

4. Leriche, Rene and Policard, A.: The Normal and Pathological Physiology of Bone. St. Louis. C. V. Mosby & Co. 1928.

3. Enlargement of Haversian canals (compact bone).

4. Presence of osteoclasts.

"(b) The macroscopic signs of bone resorption.

1. Bone becomes softened.

2. Bone bleeds easily at cut surfaces.

(These signs become particularly apparent during root resection.)

"(c) Roentgenographic signs of bone resorption.

1. Increased radiolucency due to decreased density.

2. Loss of characteristic trabecular architecture."

In order to translate the roentgenographic signs of bone resorption into understandable clinical terms we must establish insofar as possible the etiological factors responsible for them, whether they are bacterial in origin or arise from a preexisting hyperaemic state. This problem has been under investigation for some time. In 1924, Haden[5] made cultures of the periapical tissue of 1,307 extracted vital and pulpless teeth and compared the findings with the roentgenograms. His method of culture involved an attempt to sterilize the field with tincture of iodine, followed by alcohol, with the subsequent extraction of the tooth. Clinical experience has shown that this method not only invites the common possibility of contamination from the gingival crevice and soft tissue debris adhering to the root surface, but also is impractical since it necessitates sacrificing the tooth itself. Autopsy findings seldom benefit the patient. Furthermore, it has been demonstrated that the pumping action attendant upon extraction will give rise to positive cultures routinely. O'Kell, and Elliot[6] made observations on 138 patients with both septic and clean mouths. In 138 patients ten cc. of intravenous blood were taken immediately before and within 5 min. after extraction. Of these 84 showed a transient bacteremia (Strep. anhemolyticus) after extraction. The occurrence and degree of bacteraemia depended on the severity of gum disease present and the amount of damage inflicted during the operation. In 10 cases where a positive blood culture was obtained immediately after extraction a third culture taken 10 min. to 8 hours later was always negative.

Haden[5] found that the incidence of infection is about as high in the roentgenographically negative as in the roentgenographically positive teeth; that there is a very sharp limitation in the translation of roentgenographic evidence of infection into terms of bacteria; and that the absence of roentgenographic evidence of infection at the apex of a pulpless tooth never excludes the presence of active infection.

Cramer and Reith[7] cultured 200 freshly extracted pulpless teeth and came to the following conclusions:

"1. Granulomas are invariably infected.

"2. Apical areas about radiographically positive teeth are probably invariably infected.

"3. Teeth with slight parapical change are infected to a less degree than those with more pronounced pathology, and further classification may be possible.

"4. Teeth definitely negative radiographically are infected only occasionally."

M. J. Frendelling and T. L. Cartney[8] studied the roentgenographic records of vital pulp infection as confirmed

5. Haden, R. L.: Bacteriology of Chronic Periapical Dental Infection. J.A.D.A. 1926, 13:1370.

6. Okell, C. C., and Elliott, S. F.: Bacteremia and Oral Sepsis with Special Reference to Etiology of Subacute Endocaritis. Lancet, 2:869-872 (Oct. 19) 1935.

7. Cramer H. C., and Reith, A. F.: Quantitative Bacteriologic Study of Pulpless Teeth Correlated with Dental Roentgenograms. J.A.D.A. 19:976-982. 1932.

8. Fuendling, M. J., and Cartney, T. L.: Roentgenographic Diagnosis of Vital Pulp Infection as Confirmed by Bacteriological Examination. Am. J. Roentgenol. 40:386-391, 1938.

by bacteriological examination. *They concluded that chronic infection of vital pulp tissue can be diagnosed from the dental roentgenogram.*

Ehnis[9] speaks of periapical lesions and their causative factors as follows:

"If the streptococcus is of the hemolytic type of high virulence, and the resistance of the patient is low, the inflammation will be acute and may result in acute abscess formation. If this does occur, with evacuation of the pus under proper treatment, the condition may rapidly subside, with practically no detachment or destruction of the alveolodental periosteum, and no appreciable destruction of bone.

"In case the invading organism is of the viridans type, of low virulence the inflammatory reaction is apt to be chronic, giving rise to little apparent disturbance, but slowly progressive and proliferative in nature. The first change seen in the alveolodental periosteum is a thickening of this tissue, which is infiltrated with various blood elements but especially polymorphonuclear and small round cells, particularly the latter."

In table I of our studies showing the periapical bone lesions caused by Streptococcus viridans, we have found the organism present in every stage of bone pathology, from those that appear roentgenographically normal to and including radicular cysts.

In table III it will be seen that Streptococcus hemolyticus occurs very rarely. Of 174 cases examined this organism was found only twice.

Arnett and Ehnis[10] made a study of dental roentgenograms in connection with the past history and physical examination of 800 college students in which they demonstrated no relation between periapical infection and any particular disease entity. These authors assumed that all periapical radiolucent

TABLE I—PERIAPICAL BONE LESIONS CAUSED BY STREPTOCOCCUS VIRIDANS

Reg. No.	Roentgenographic Diagnosis	Etiology	Vitality	Tooth No.	Systemic Involvement
3653	Granuloma	Carious exposure	—	9	None
3724	Granuloma	Carious exposure	—	7	None
3411	Granuloma	Carious exposure	—	24	None
6472	Normal	Carious exposure	+	13	None
3909	Normal	Carious exposure	+	20	None
4840	Normal	Carious exposure	—	20	None
3615	Chronic proliferative osteitis	Blow	—	8	None
6045	Chronic alveolar abscess	Carious exposure	—	8	None
3189	Chronic alveolar abscess	Metal filling	—	6	None
3416	Chronic proliferative osteitis	Metal filling	—	7	None
3416	Chronic circumscribed osteitis	Carious exposure	—	10	None
3618	Chronic proliferative osteitis	Silicate filling	—	9	Acne on face
3618	Chronic proliferative osteitis	Silicate filling	—	10	Acne on face
7196	Chronic circumscribed osteitis	Carious exposure	—	7	None
3653	Granuloma	Carious exposure	—	9	None
1667	Radicular cyst	Carious exposure	—	6	Rh. arthritis
1667	Radicular cyst	Carious exposure	—	7	Rh. arthritis
3724	Granuloma	Carious exposure	—	7	None
Sp199	Chronic alveolar abscess	Blow	—	8	None
3263	Chronic alveolar abscess	Carious exposure	+	6	None
3766	Chronic circumscribed osteitis	Silicate filling	—	9	None
3602	Chronic circumscribed osteitis	Metal filling	—	6	None
Sp500	Chronic proliferative osteitis	Silicate filling	—	8	None

9. Ehnis, L. M.: Dental Roentgenology. 3rd edition. Phila. Lea & Febiger 1939, p. 273.

10. Arnett, J. H., and Ehnis, L. M.: Dental Infection and Systemic Disease. D. Cosmos 75: 561-569, 1933.

areas were infected.

L. W. Burkett[11] made cultures from 419 periapical areas in cadavers between the ages of 20 and 50. This age group corresponds to that covered in this survey. Of this number, he found 206 or 49% contained organisms. An average of 4 periapical areas were cultured in each case in addition to examinations of the alveolar marrow. A comparison was also made between the frequency with which the organisms occurred in the viscera including the liver, kidneys and spleen, and in the periapical region of the same case. Streptococcus viridans constituted only 8.3% of the organisms of all the positive visceral cultures, but 62% of those of the periapical cultures. Streptococcus viridans is found with greater frequency in periapical regions than in alveolar marrow or *abdominal viscera.* Negative cultures were obtained in all instances where the apex was not reached. Burkett fails to specify the nature of the canal contents in these instances. His results of cultures made deliberately from the alveolar bone marrow were negative in 34 of 35 cases examined. *This supports the view that the cementum covering the root surface acts as an impenetrable barrier preventing the passage of any foreign material in either direction.*

Burkett grouped teeth as follows:

"1. Non-carious teeth with no clinical evidence of caries. 50
2. Restorations in teeth in which restorations had been made 115
3. Exposures. Teeth in which the pulp chambers were communicating with oral cavity 50
4. Pulpless teeth."

It was found that there was a definite decrease in the percentage of pure cultures and an increase in the size of periapical radiolucent areas. In no case was Streptococcus viridans cultured from the alveolar bone marrow. A higher percentage of pure cultures was obtained from the periapically roentgenographically negative teeth than from those with apical roentgenographic changes. The frequency of mixed cultures increased with the development and increase in size of the periapical roentgenographic lesions. This of course is to be expected because as the lesions become chronic and of long duration the tendency for mixed infections is apt to increase.

Frankel[12] analyzed the dental and systemic findings on 19,000 persons insured by the Metropolitan Life Insurance Company and found no correlation between any systemic disturbance and the extent of dental restorations.

Herman Osgood[13] states that the type of reaction as seen in the roentgenogram will indicate in general whether the patient's resistance to infection is high or low. The granuloma type of reaction occurs more commonly in young adults whose resistance is high; whereas the blind or chronic abscess with scar bone reaction occurs more commonly in individuals of lowered resistance.

ROENTGENOGRAPHIC TECHNIQUE OF OUR STUDIES

Since the purpose of this survey is primarily intended to correlate clinical bacteriologic data with the actual roentgenographic findings of various types of periapical lesions, it is necessary that accurately timed and processed roentgenograms be obtained under strictly standardized conditions. In all our clinical cases Eastman regular films were used throughout, exposed with a standard

11. Burket, L. W.: Recent Studies Relating to Periapical Infection Including Data Obtained from Human Necropsy Studies. J.A.D.A. 25:260-272, 1938.

12. Frankel, L. K.: Consideration of Evidences on Oral Sepsis in Relation to Systemic Disease. D. Cosmos, 66:35, Jan. 1924.

13. Osgood, H. A.: Evaluation of Roentgen Findings in Relation to Focal Infection and Systemic Disease. Am. J. Roentgenol., 36:751, Dec. 1936.

Ritter dental air-cooled tube operating at 10 a.m. and 45,000 volts. Wherever errors in exposure or angulation failed to reveal clear-cut bone architecture, retakes were made so as to rule out any possible misinterpretations.

ROENTGENOGRAPHIC INTERPRETATIONS

Cases were considered normal wherever the periodontal membrane and lamina dura appeared undisturbed. The surrounding bone was considered normal wherever the trabeculae and cancellations had uniform distribution for the particular age of the patient. This of course varied from large cancellations for young individuals to very small ones with thick trabeculae for those of middle age.

Vital degenerating pulps, although occasionally recognized by means of a halo of radiolucency in the periapical region, were not considered as such in the present study. The acute alveolar abscess when seen in its early stages may be practically invisible or else give the cancellous bone a somewhat cloudy appearance. Since these cases seldom reach our postgraduate clinic at their inception, we generally see them after proliferation of the periodontal membrane has taken place.

The chronic alveolar abscess, sometimes referred to as chronic rarefying osteitis, shows advanced thickening or destruction of the periodontal membrane with localized resorption of the approximating trabeculae. Care should be exercised not to misinterpret the enlarged marrow spaces caused by trabecular resorption as normal bone.

Granulomas, being connective tissue tumors of more or less definite outline, are simply a more advanced stage of the chronic alveolar abscess, there being no sharp line of demarcation between the two. The well advanced type of granuloma may further be mistaken for the chronic circumscribed type of osteitis, in which, although there is a resemblance to the granuloma in appearance at times, the bone is not replaced by connective tissue. One is frequently impressed with this fact when, on resecting the involved tissue, it is found that the roentgenographic interpretation does not correspond with the clinical findings.

The chronic proliferative types of osteitis, sometimes called chronic rarefying osteitis with suppuration, are usually well advanced radiolucent areas with poorly defined outlines. They appear darker in the region of the root tip and gradually fade out into the surrounding normal bone. Upon resection the amount of bone involved is invariably

TABLE II—PERIAPICAL BONE LESIONS CAUSED BY VARIETY OF ORGANISMS

Reg. No.	Roentgenographic Diagnosis	Etiology	Vitality	Tooth No.	Systemic Involvement
4853	Chronic alveolar abscess	Carious exposure	—	14	None
4242	Chronic alveolar abscess	Carious exposure	—	7	None
4836	Chronic proliferative osteitis	Metal filling	—	6	None
7519	Chronic alveolar abscess	Metal filling	—	8	None
7519	Chronic alveolar abscess	Silicate filling	—	7	None
7519	Chronic alveolar abscess	Metal filling	—	10	None
6197	Chronic alveolar abscess	Carious exposure	—	22	None
3615	Normal	Carious exposure	+	3	None
4865	Normal	Carious exposure	+	3	None
3189	Normal	Carious exposure	—	11	None
5782	Normal	Carious exposure	+	19	None

far more extensive than that which the roentgenogram seems to indicate.

The cyst, in contradistinction to chronic proliferative osteitis, represents a well defined area of fairly uniform radiolucency and over 3/8" in diameter. At certain stages, however, what appears to be a cyst will actually prove to be an advanced suppurative type of osteitis.

ELECTRIC VITALITY TESTS

It should be remembered that the electric vitality tests merely record nerve irritability of the fibers within the pulp tissue and give no accurate information as to the status of the circulatory elements. Nerve tissue, because of its fat content, is more highly resistant to extrinsic injurious agents than are the delicate endothelial cells forming the fine pulp capillaries. Therefore, the first change that occurs whenever a pulp is subjected to an injury such as caries, trauma or instrumentation is a disturbance in the circulatory elements, together with the usual degenerative changes manifested in the form of calcium deposits throughout the structure of the pulp tissue. A breakdown of the delicate capillaries occurs long before the resistant nerve fibers have ceased to function. Although the electric vitality test gives a rough indication of nerve response to stimuli, it does not tell us what is occurring within the blood vessels themselves, which, after all, are the actual conveyors of injurious agents responsible for changes in the periapical bone architecture, whether these be bacterial toxins, protein poisons, or waste products resulting from tissue stagnation.

Thoma[14] described a vital pulp as follows:

"As long as metabolism takes place, we may speak of the pulp as vital, but at the same time it may be diseased, just as a person may be alive and at the same time sick."

In recording thermal tests, it was found that the time required to produce sensation when changing from hot to cold gives a more sensitive response than when either heat or cold is used alone. Because of the many uncontrollable errors involved in the variable thermal capacity of teeth with or without pulp recession under restorations we have come to regard thermal tests, generally, with considerable misgiving.

In the survey here reported all available means of determining the actual vitality were employed. Cases listed as vital must be regarded as such within the present limits of diagnostic methods at our disposal for ascertaining vitality. From the many positive cultures obtained from vital pulpectomy, it is obvious that so called vitality as an indication of health of the pulp is a somewhat misleading term, since it in no sense tells us the actual amount of infection that is being carried by the capillaries within the confines of the pulp chamber or canal.

CULTURE TECHNIC

All the cases reported in this survey were of teeth clinically treated, the strategic importance of which warranted their retention. Cultures were made in every case, *in situ,* through the canal is follows:

After placement of rubber dam, a field of operation comparable to the size of the rubber dam frame was sterilized with 7% tincture of iodine, followed with a 70% alcohol wash. Access into the pulp chamber was made with a sterile burr. If a roentgenographically negative vital pulp was to be removed and cultures taken, care was exercised to go only to the dentinocemental junction with small Kerr 1, 2 & 3 files accurately marked for length. The files were passed to the junction solely to

14. Thoma, K. H.: Infected Vital Dental Pulp. J. D. Res., 8:529, Aug. 1928.

expedite the safe use of barbed broaches for pulp extirpation. Immediately after pulp removal a culture of the moist canal was made by passing a sterile J & J point to the canal, allowing it to remain until well moistened, and then inoculating a tube of beef infusion ascitic fluid, semi-solid media.

If a roentgenographically positive devital tooth was to be cultured, access to the lesion was made as before, being careful to pass the marked files just to the lesion in order to gather sufficient inoculation on the J & J point for culture. Because of the varying amounts of stagnant tissue debris in the canal care should be exercised not to carry foreign material into the periapical tissues in order to avoid an acute exacerbation. In addition to inoculating two tubes for each tooth, direct smears were made.

Two inoculations into separate culture tubes were made for each single rooted tooth while each canal was cultured separately in the case of multirooted teeth. Two sets of negative cultures were obtained at intervals of 48 hours. All of the above technique was carried out under strictly aseptic conditions.

Method of Treating Canals

In order to supplement the explanation as to the methods employed in taking cultures of teeth, a brief discussion of our methods of treatment may suffice. In our school clinic, vital teeth of strategic importance which show normal periapical tissues, but in which the clinical crown has suffered a pulp involvement either through caries, trauma, or instrumentation, are treated by routine therapeutic methods which have proven themselves highly successful during the past 15 years. All carious cavities are carefully excavated and a dressing of eugenol sealed in contact with sound dentin for at least 24 hours before pulpectomy is contemplated. Teeth in which an approximal cavity exists are carefully fitted with an accurately contoured copper band which is cemented to the crown during the entire period of treatment in order to avoid any possible contamination through leakage of saliva. After placement of the rubber dam the entire field of operation comparable in size to the outline of the rubber dam frame is thoroughly sterilized with a 7% tincture of iodine followed with a 70% alcohol wash. Opening to the pulp chamber is made with a sterile spade burr. Teeth in which a vital pulp is to be removed are accurately measured for distance from crown to the dentinocemental junction. This length is recorded on the patient's history chart for further reference. After removal of the pulp the canal moisture is absorbed on sterile J & J points which are inoculated into culture tubes. Essential oils such as eugenol or oil of cloves or a mixture of iodine and glycerine are then sealed in the canal. In order to be sure that the drug used in the preceding treatment will not obscure a possible positive culture an experiment was made in which the drug points which had been sealed in the canals 48 hours were inoculated into the culture media at the same time that a new paper point was cultured in the routine manner. The variation of the culture result was insignificant. A further check is also made by taking two sets of cultures of each case. When sealing the first treatment point a pellet of cotton is placed over the dressing followed by a seal of temporary stopping which is carefully burnished against the walls of the pulp chamber. This primary seal is coated with sandarac varnish. A creamy sticky mix of Caulk's petroid cement is then used as the final seal. The patient returns for the second treatment after a 48 hour period, when the culture report is ready. The rubber dam is again

TABLE III—PERIAPICAL BONE LESIONS CAUSED BY STREPTOCOCCUS ANHEMOLYTICUS

Reg. No.	Bacteriology	Roentgenographic Diagnosis	Etiology	Vitality	Tooth No.	Systemic Involvement
6138	Strep. anhemolyticus	Radicular cyst	Metal filling	—	8	Acute infection
7522	Strep. anhemolyticus	Chronic circumscribed osteitis	Carious exposure	—	24	None
7421	Strep. anhemolyticus	Chronic circumscribed osteitis	Carious exposure	—	10	None
3439	Strep. anhemolyticus	Chronic proliferative osteitis	Blow	—	8	Erysipelas
4310	Strep. anhemolyticus	Chronic proliferative osteitis	Blow	—	24	—
6469	Strep. anhemolyticus	Chronic alveolar abscess	Old root filling	—	10	None
7623	Strep. anhemolyticus	Chronic alveolar abscess	Carious exposure	—	9	General malaise
5201	Strep. anhemolyticus	Chronic proliferative osteitis	Carious exposure	—	10	Acute naso-pharyngitis
2901	Strep. anhemoluticus	Chronic alveolar abscess	Old root filling	—	4	None
3928	Strep. anhemolyticus	Chronic alveolar abscess	Carious exposure	—	24	Frequent headache
3928	Strep. anhemolyticus	Chronic alveolar abscess	Carious exposure	—	25	Frequent headache
7876	Strep. anhemolyticus	Chronic proliferative osteitis	Metal filling	—	7	Chronic colds
3766	Strep. anhemolyticus	Chronic proliferative osteitis	Blow	—	7	None
4559	Strep. anhemoluticus	Chronic proliferative osteitis	Blow	—	6	None
4717	Strep. anhemolyticus	Chronic alveolar abscess	Metal filling	+	7	None
3766	Strep. hemolyticus	Chronic circumscribed osteitis	Metal filling	—	8	None
3393	Strep. hemolyticus	Normal	Carious exposure	+	4	None

placed, the field sterilized as before opening through the cement seal made with a sterile burr until the primary gutta percha seal is reached. This is carefully removed with a sterile spoon excavator or explorer, and the dressing is removed. A second culture is taken and if the first cultures have shown a growth a suitable germicide is sealed in preceded by a thorough washing of the canal with Kerr's tri-chlor or normal saline solution to remove any vestiges of debris. In this way the treatment drug is not dissipated by absorption into pulp debris or dentin filings, but comes into direct and intimate contact with the entrance to the dentinal tubules and their contents. Cultures are taken until two negatives are obtained in sequence. In the majority of instances, this is accomplished in 3 or 4 treatments.

Cases showing progressive destruction of the periapical bone are managed in a similar manner to that just described except that prior to sealing the canals the dentinal surface is treated with a powerful solution of dehydrated phenol sulphonic acid, followed by neutralization with sodium bicarbonate and water. Owing to its powerful affinity for moisture the acid removes from the dentinal tubules whatever foreign matter that may have remained. After hermetically sealing the sterile canals the apex and

surrounding tissue are removed surgically in every case of advanced bone destruction. This is comparable to what could have been accomplished by extraction except that an important masticatory organ has not been sacrificed.

Return of the periapical tissues to their respective state of normalcy has been found to occur in the great majority of cases as shown by histological sections of bone and teeth so treated, by Hatton,[15-16] Kronfeld,[17] Coolidge[18] and others.

In exceptional cases where extensive periapical destruction has already occurred it is impossible to render the canal sterile by ordinary therapeutic methods. We have found however, that several successive cultures will show a sufficient decrease in the number of organisms previously present so that a resection can be satisfactorily performed by using dehydrated phenol sulphonic acid just prior to filling the canal. The great majority of cases listed in this survey were patients betwen 18 and 30 years, the roots of whose teeth were resected immediately after sterility was assured by the negative cultures.

Discussion of Results

This survey includes 174 cultures taken from pulp involved teeth in ambulatory patients ranging in age from 18 to 35 which were under treatment in our root surgery clinic. The purpose of this study was to determine how the roentgenographic diagnosis agreed with the actual bacteriologic cultures obtained from such teeth *in situ*, and their possible relationship to any systemic complaint that may have been present. An attempt was also made to evaluate the pulp vitality tests. A thorough physical diagnosis of the patient's general health was recorded on a history chart in every case. The etiologic factor responsible for the pulp involvement was carefully recorded insofar as it could be determined clinically or from the patient's history. Negative cultures were obtained from all types of roentgenographic lesions. It should also be noted that positive cultures were obtained from teeth which appeared roentgenographically normal. Of positive cases it can be seen

TABLE IV—RELATIONSHIP OF ROENTGENOGRAPHIC DIAGNOSIS TO BACTERIOLOGY

Roentgenographic Diagnosis	No. of Cases	Bacteriology								
		Neg.	Strep. An-Hemolyticus	Strep. Viridans	Strep. Hemolyticus	Strep.	Staph. Albus	B. Acid-Ophilus	B.A.& St. Vir.	Variety Organisms
Chronic alveolar abscess...	45	20	6	6	0	4	0	0	3	6
Granuloma....	14	10	0	3	0	1	0	0	0	0
Chronic proliferative osteitis	22	6	6	5	0	2	1	0	1	1
Chronic circumscribed osteitis	15	5	2	4	1	2	0	0	1	1
Cyst.....	4	0	0	2	0	2	0	0	0	0
Negative.....	64	40	14	3	1	2	0	1	0	4

15. Hatton, E. H.: Histologic Studies of Living Tissue Reactions Associated with Pulpless Teeth That May Be Taken as Evidence of a Satisfactory or Physiologic Healing. J.A.D.A., 18:1502, Aug. 1931.
16. *Idem:* Structural Changes in Periapical and Other Oral Infections: Processes and Their Significance. J.A.D.A., 24:1749, Nov. 1937.
17. Kronfeld, R.: The Present Status of the Pulpless Tooth. Bur. March 1923, p. 17.
18. Coolidge, E. D.: Root Resection as a Cure for Chronic Periapical Infection. J.A.D.A., 17:239-249, Feb. 1930.

that cases from which Streptococcus viridans was isolated varied from perfectly normal parodontal membranes down through every stage of bone change to and including the radicular cyst. There was no evidence of selectivity as to the type of bone lesion produced or to its extent. Furthermore Streptococcus viridans was isolated from vital pulps as well as those found to be non-vital; of 27 cases yielding Streptococcus viridans on culture only two gave a history of systemic complaint, one being rheumatoid arthritis and the other acne of the face. The roentgenographically normal. Table III lists 15 cases from which Streptococcus anhemolyticus was isolated, of which 7 gave a history of systemic involvement. All cases showed roentgenographically evidence of advanced bone pathology and in no case was Streptococcus anhemolyticus isolated from a tooth that appeared roentgenographically normal, or one having a granuloma present. This fact should be of some clinical significance when considering well advanced lesions where a history of systemic involvement is present. There is no specificity as to

TABLE V—RELATIONSHIP OF ROENTGENOGRAPHIC DIAGNOSIS TO THE BACTERIOLOGY AND VITALITY

Roentgenographic Diagnosis	No. of Cases	Bacteriology			
		Negative	Vitality	Positive	Vitality
Chronic alveolar abscess	45	20	Vital 5 Non-vital 15	25	Vital 3 Non-vital 22
Granuloma	14	10	Vital 0 Non-vital 10	4	Vital 0 Non-vital 4
Chronic proliferative osteitis	22	6	Vital 1 Non-vital 5	16	Vital 0 Non-vital 16
Chronic circumscribed osteitis	15	5	Vital 1 Non-vital 4	10	Vital 5 Non-vital 5
Cyst	4	0	Vital 0 Non-vital 0	4	Vital 0 Non-vital 4
Negative	64	40	Vital 26 Non-vital 14	24	Vital 22 Non-vital 2

actual correlation of the organism to the systemic complaint is highly problematical. The etiological factors responsible for pulp involvement in these cases varied from carious exposures to all types of restorations. In table II, eleven cases yielded cultures containing a variety of organisms. The etiologic factor in seven of the eleven cases was carious exposure. The possibility of mouth contamination through carious lesions undoubtedly accounts for this variability.

The majority of the cases appeared the type or extent of the lesion associated with anhemolytic Streptococcus although in every instance the lesion was chronic, well advanced and involved considerable tissue.

In table III we also find that of all cases examined Streptococcus hemolyticus was found only twice, once in an apparently normal vital tooth and once in the presence of a chronic circumscribed osteitis. In neither case was a systemic involvement present. This is particularly significant in view of the well known virulence of this group of organ-

isms and the fact that it is generally believed that Streptococcus hemolyticus is the organism responsible, in many instances, for the infectious forms of arthritis. In the arthritic clinic at the University of Michigan, Dr. Freyburg[19] attributes little if any significance to Streptococcus hemolyticus as an etiological factor in infectious arthritis. The rarity of occurrence of this organism in the teeth should be borne in mind when ever the teeth are suspected as possible causative factor of arthritis.

Pemberton[20] states:

"The day is past when in the presence of refractory arthritis, an important tooth should be sacrificed merely because it is not vital."

Table V shows the relationship between vitality tests, bacteriologic cultures and roengenographic findings. It will be noted that of 45 cases that appeared as chronic alveolar abscesses, 20 were negative, of which 5 were vital. These 5 cases would indicate that although periapical changes had progressed as a result of circulatory disturbances within the pulp, the nerve fibers were still capable of registering irritability.

Of 14 cases diagnosed roentgenographically as granulomas, 10 were found to be negative and 4 positive. All cases were non-vital. This is contrary to the general belief that all granulomas are infected.

Of 22 cases diagnosed roentgenographically as chronic proliferating osteitis, 6 were negative and 16 positive, and of the total number, only one was reported vital. This vitality is contrary to what one would expect in a well advanced lesion and may have been due to error in recording vitality.

Of 15 cases diagnosed roentgenographically as chronic circumscribed osteitis 5 were negative and 10 positive, and of the total number 6 cases gave positive vitality response. This again demonstrates that roentgenographically positive teeth frequently give vitality response.

Of 4 cases diagnosed roentgenographically as cysts, all were infected and tested non-vital.

Of 64 cases diagnosed as roentgenographically negative, 40 were bacteriologically negative and 24 positive. Of the 40 that were bacteriologically negative, 26 were vital and 14 non-vital. Of the 24 that were bacteriologically positive 22 were vital teeth and only 2 were non-vital.

From this it will be seen that there is no relationship between the roentgenographic appearance of a tooth, its possible bacteriologic content, nor the state of its circulatory elements.

Conclusions

1. It has been pointed out that many types of bone characteristics which appear to be abnormal may be normal for certain individuals or for certain specific regions and may not necessarily indicate the presence of infection.

2. Inasmuch as bacteriological findings do not wholly confirm the roentgenographic appearance of periapical lesions too much emphasis should not be placed on the roentgenographic interpretation as a diagnostic agent in condemning questionable teeth.

3. Owing to the variability of organisms found in different lesions, it is not possible to attribute any correlation between the nature of periapical disturbance and the specific organism responsible for it.

4. In view of the rarity of proven cases of systemic involvement associated with teeth that appear roentgenograhically and bacteriologically positive, we feel there is considerable question as to the importance which has been attached

(*Concluded on Page 190*)

19. Freyberg, Richard.: University Hospital, University of Michigan. Personal communication.
20. Pemberton, Ralph: Arthritis and Rheumatoid Conditions. Lea & Febiger, Phila., 1929, pp. 170-171.

The Illinois Dental Journal

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• EDITORIAL •

Survey of Dental Needs

A preliminary survey of the dental needs of our adult population is reported by Dr. R. N. Walls, Chairman of the A. D. A. Economics Committee in the May issue of the *Journal of the American Dental Association.*

After reading the report and finding that no conclusions of practical value to the average dentist are given, one is apt to ask—so what? Therefore, we hasten to point out that this first survey was but an experiment, preliminary to a more extensive and conclusive one. Its purpose was to determine whether or not the few dentists canvassed would report in detail the dental needs and economic conditions of a limited number of their patients. It is emphasized also that a further purpose of the experiment was to discover any shortcomings in the card used for tabulating the desired information.

From the announced plan for conducting the larger survey (Society Bulletins, this issue) it is assumed that the experiment accomplished its first purpose in the affirmative. This new survey will be conducted by 10,000 dentists, selected as representatives of the various geographic sections of the country, who will tabulate the dental requirements of five patients during the week of May 27th. Such a sampling should provide much valuable information of a practical nature, especially as relates to a logical solution of current dental socio-economic problems.

Undoubtedly, many Illinois dentists will be asked to participate in this larger survey. It is expected that each of these will cooperate to his fullest extent. No more worthwhile enterprise has been undertaken by the Economics Committee of the American Dental Association. We are in full accord with the objectives of both the preliminary and future survey.

Welcome, Dr. Timmons

A new executive officer has been appointd to the staff of the Central Office of the American Dental Association in the person of Gerald D. Timmons, former acting dean of the University of Indiana Dental School. The appointment was recently made by the Association's Board of Trustees, after an extensive search for

a suitable candidate, in compliance with a resolution adopted by its House of Delegates at St. Louis in 1938.

Dr. Timmons was given the title of Executive Secretary and his duties, according to the Board's announcement, "will be to make a thorough study of the various activities of the Association, with particular reference to the possibility of better coordinating these activities to avoid overlapping of effort, to increase effectiveness and to bring about economies where possible; also to make an analysis of the activities of the Association now carried on outside the Central Office, or recommending the establishment of such additional bureaus or commissions as may be advisable."

We have long advocated the unscrambling of present A.D.A. committee assignments in order to accomplish more effectively and economically the purpose of our national organization. The above order is rather large for consummation by one individual, but if given time and the cooperation of all concerned, we have every reason to believe that Dr. Timmons will find proper solutions to the many troublesome problems.

The coming of Dr. Timmons to Chicago adds a highly respected dentist to the membership roll of the Illinois State Dental Society. We extent our hand in welcome, Jerry, and with it every hope for success in your new undertaking.

• *PRESIDENT'S MESSAGE* •

The Annual Meeting brings to a culmination the activities of our Society for another administrative year.

The current celebration of a Century of Dental Education symbolizes the progress that organized dentistry has made in its first hundred years. But each added year brings forth some further advance, some additional progress which, little as it may seem at the time, contributes to the forward movement of the whole.

One reason that our profession has made such rapid strides is that the members of our Society realize it is their duty to serve the profession throughout their careers in return for that which they received when they entered its ranks.

In the commercial fields, trade secrets and patent rights, which cannot be used without severe penalties, confront the beginner. In our calling, all the knowledge of those who have gone before is laid at one's feet to use at will. So, every dentist realizes the debt he owes his profession; and in return, he endeavors to liquidate that debt by whatever contribution he can make.

It is because of this fact that men are willing and anxious to serve the Illinois State Dental Society. It is because of this fact that one holding the office of President derives so much genuine pleasure from his efforts.

It has been a great privilege to serve as your President and I wish to extend my thanks for the loyalty and cooperation manifested by all of you during the past year.

Earl P. Boulger

***Play Day—Springfield—May* 13**

• HERE & THERE •

Think back a number of years to this very month; can you remember where you were and what you were doing? Let us refresh your memory. You were in the last throes of receiving your dental education. You were in a dither about finishing your clinical requirements. Ahead of you were final practical exams, final written exams, and the State Board with its attendant headaches. Could you line up a foil patient? Would the patient show up? If the patient arrived, would you arrive with a finished foil by the appointed time? Might you crack the facing on your Richmond Crown? Would you finish your set-up in time? If you passed the State Board where would you get enough dollars or credit to open up an office? Do you remember all that?

Now you are a practicing dentist and all through with worry. Life is just a feather bed lined with fragrant rose-petals. Ha! Ha!

We listened to two senior dental students discussing their troubles over a cup of coffee; as the poetic writing gentry are wont to say it gave us a moment of sweet nostalgia—but only a very fleeting moment. We would much rather worry about the rent, the float in Mrs. Jones' floating lower, and a handful of uncollectable accounts.

H & T

A good story is the one Bob Humphrey tells about O. A. Helmer. It seems that O. A., out on a hunting trip with Bob and a few of the boys, shot a goose. And imagine his surprise to find that said goose not only had a rope around its leg which was tied to a stake, but that it also belonged to a certain farmer.

H & T

We have gleaned, here & there, the following few personals which we hope you will enjoy reading: R. E. McBoyle addressed the G. V. Black Society in Springfield in February. . . . Bill Datz is even happier now than he was; the baby, a seven and one half pound girl arrived April 11. . . . Stanley Tylman, who is in the midst of writing a book on crown and bridge work, is the new editor of *The Dahlia,* official publication of the Central States Dahlia Society. . . . Mike Hughes, Illinois '22, is the new Grand Master of the Chicago Auxiliary of Delta Sigma Delta. . . . Balint Orban has returned to Loyola Dental School as director of the Foundation for Dental Research; for some time he has been teaching at Northwestern Dental School. . . . Carl Greenwald is Chief of the Dental Division of the Chicago Department of Health; the regular budget of this department is $60,000 a year. . . . Elbert Crosby Pendleton, former president of the State Society, has a fine article in the May issue of the A.D.A. Journal. . . . Jim Mahoney of Wood River wrote us a letter and sent along a clipping from *The Egyptian Legionnaire.* According to the tenor of this publication we take it that the Legion had enough fighting in the last war they aren't even interested in any other wars; maybe they have something there. . . . P. G. Puterbaugh has just finished building

a home down in Indiana. . . . Mike Buckley, long an active Illinois and Chicago Dental Society member, has had a long spell of sickness; we want to wish him good luck and a speedy recovery.

H & T

Frederick B. Noyes, dean of the University of Illinois College of Dentistry for the past fourteen years, will retire from that position on September first. Doctor Noyes, who is one of the most prominent and nationally famous of our members, has been a dental educator practically all of his professional life. The students and alumni at Illinois will certainly miss this snowy-haired gentleman. Maynard Hine voices the sentiments of Illini in the last issue of the Alumni Bulletin when he says: "Dr. Noyes has been identified with our college so definitely that to many of us he personifies the institution, or perhaps we should say the College is a reflection of him. When classes meet in September 1940, we who have studied and worked with Dean Noyes shall feel that an integral part of the College is missing."

The new dean, Dr. Howard N. Marjerison, comes to Illinois after having been dean of Tufts Dental College since 1934.

H & T

Again we credit Maynard Hine, who called to our attention an article in the New Yorker. In it is described the activities of one Richard Appel, a refugee from Germany, who has already established himself as one of the largest manufacturers of exploding cigars, water squirting rings, and other joke novelties. Mr. Appel finds that the largest buyers of his products are *dentists,* song writers and fraternity men. He has no theory as to why. Mr. Appel's old factory in Germany is now turning out shell casings which may be Hitler's idea of the latest joke novelty.

H & T

This of course is the month in which we play our first game of golf. Yes, you guessed it, in Springfield. We hope to see you all at the State Meeting. If you have never been to an Illinois State Meeting before, take our word for it that this is one of the best meetings of the year on all counts.

President Earl Boulger has done a really splendid job for the past year; if you noticed, however, in the group picture in the March issue of the JOURNAL he looks both pleased and relieved. Earl is an untiring worker with an absolute flair for organization. This meeting, which at the date of writing is still in the future, promises to be unusually large and a tribute to the ability of our President.

H & T

According to a news report the Smiths are the most common people in America. Of course what we mean to say is that there are more people by the name of Smith in the United States than by any other single name. The Johnsons are next, and then the Browns, Williams, Millers and Jones come in that order. Who'd ever have thought that the Smiths were so prolific.

Wm P. Schoen, Jr.

Outstanding Essayists—State Meeting

SENATE REFERENCE COMMITTEE RECOMMENDS PASSAGE OF DENTAL RESEARCH BILL

The $75,000 Dental Research Bill (S3607), sponsored by the National Health Program Committee of the American Dental Association and authored by Senator James E. Murray was reported out of the Committee on Education and Labor, April 26, with the recommendation that it pass. The complete report of the committee is printed below because of its import to the dental profession.

The Committee on Education and Labor, to whom was referred the bill (S. 3607) to authorize research by the Public Health Service relating to the cause, diagnosis, and treatment of dental diseases, having considered the same, report thereon without amendment and recommend that the bill do pass.

Purpose of the Bill

This bill purposes to authorize the Surgeon General of the Public Health Service to conduct and direct researches, investigations, experiments, and studies relating to the cause, diagnosis, and treatment of dental disease, to assist and foster similar research activities by other agencies, private and public, and to provide the United States Public Health Service with the necessary funds for carrying out the purposes of this bill.

To this end it authorizes appropriation of $75,000 for the fiscal year ending June 30, 1941, and for the 5 succeeding years, such sum shall be increased $10,000 each year.

Prevalence of Dental Diseases

Dental caries (decay) and the periodontal diseases (pyorrhea) are the two major dental diseases. Only a very small percentage of the population escape the ravages of either or both of these diseases. A study conducted a few years ago by the American Dental Association in collaboration with the United States Public Health Service on over 1,400,000 school children in 26 States showed that more than 90 percent had one or more decayed teeth. Numerous other dental studies show that the problem of dental caries is of the same order. Owing to the fact that the tooth structure lacks the ability to repair itself as do practically all other tissues of the body, these defects accumulate at an alarming rate with increase in age of the individual.

The Nation-wide dental survey of 1,400,000 school children shows that there is an increase of 33 percent in the amount of dental decay of the permanent teeth when the 12 to 14-year-old groups are compared with the 6 to 8-year old groups. The figures have been corroborated by a smaller detailed study made by the Public Health Service in a representative American city of about 30,000 population. This rapid accumulation of dental defects, which the dental profession has been unable to cope with, accounts for the fact a large majority of the adult population of this country have one or more missing teeth.

Dental caries (decay) begins in early childhood and usually continues until most teeth have been affected. Despite the universal incidence of dental caries and its deleterious effects, the causes of dental caries have not been completely established and its general prevention has not been attained. Dental caries is an example of a disease with a high attack rate and for which no adequate control measures have been developed. As a result the 62,000 dentists of the United States have been unable to cope with this problem on the basis of present knowledge of the disease. At least partial methods of control must be developed if we are to escape in the future a toothless civilization.

In the opinion of dental authorities studies relating to cause and prevention of tooth decay are most important since the initial causes of many other serious diseases may follow in the wake of unchecked dental decay.

No more succinct summation of the whole dental decay problem can be found than that recently expressed in a publication of the American Dental Association which stated: "prevention of the most prevalent of all diseases (dental caries) assuredly deserves special attention from all who aim to conserve the public health and who seek to provide protection against the economic consequences of illness and disability."

Pyorrhea

It is common knowledge that one of the important dental diseases of adult life is pyorrhea. The cause or causes of this disease, as in dental decay, are also wrapped in obscurity. Many who are fortunate enough to save a large number of their teeth by careful attention and adequate treatment lose them later in adult life as the result of the other major disease, pyorrhea, which attacks the supporting structure of the teeth.

The high incidence of this disease in the adult population warrants careful and continuous investigation, second only to decay of the teeth.

Consideration, furthermore, will be given

to other dental diseases of less importance than tooth decay and pyorrhea, commensurate with their prevalence and severity.

DENTAL STUDIES BY THE UNITED STATES PUBLIC HEALTH SERVICE

For a number of years and with limited funds and personnel the Public Health Service has been conducting studies of certain aspects of dental disease. The problem of the prevalence of mottled enamel due to small amounts of fluorides in the drinking water was studied by the Public Health Service due to the fact that this was a problem of national scope. An important by-product of this study indicates that there is a probable relation between the mineral content of domestic water and the amount of dental decay. The work of the Public Health Service in this field has received wide recognition. From limited studies made by the Public Health Service in both dental caries and the periodontal diseases valuable information warranting the most searching inquiry has resulted. The time is ripe to expand these studies with additional funds and personnel in accordance with the provisions of this bill.

SUMMARY

The committee is cognizant that in the past very small amounts of funds have been expended for the investigation of these serious and highly prevalent diseases. It is only fitting that the Federal Government should take the initiative in this work and utilize the splendid facilities and trained investigators of the Public Health Service already operating in the National Institute of Health. They are also in a position to stimulate with small grants-in-aid those public and private institutions which are making worth-while scientific investigations in this field. These diseases are so universal among our citizens that it seems only fit that the Federal Government should take the leadership.

The committee has given much consideration to the question as to the amounts of the authorizations of appropriations and as to the question of a single or continuing authorization. The committee believe that there is no room for reasonable doubt that any attack on the dental-disease problem must be a long-range program, and that such a long-range program is the very heart of the structure upon which our future methods of the control of these diseases must rest.

The committee is of the opinion that this small annual amount will do much to direct a concentrated attack on a very serious problem affecting many millions of our population.

• *BOOK REVIEW* •

CLINICAL PATHOLOGY AND TREATMENT OF THE DENTAL PULP AND PERIODONTAL TISSUES. *By Edgar D. Coolidge, B.S., M.S., D.D.S., Professor of Therapeutics, Preventive Dentistry and Oral Hygiene, Chicago College of Dental Surgery, School of Dentistry, Loyola University, Chicago, Illinois; Formerly Professor of Materia Medica, Pharmacology and Therapeutics of the School of Dentistry, University of Illinois. Pp. 461, illustrated with 289 Engravings. Lea & Febiger, Washington Square, Philadelphia, Pennsylvania. 1939. Cloth. Price $6.50.*

This volume represents the most modern concept of the etiology and treatment of the diseases of the dental pulp and the periodontal tissues. It is an obvious climax to the endeavor of over 25 years of scientific research and practical teaching.

As a guide to students and practitioners of dental health it is the best, both from the standpoint of arrangement and that of material presented. To my knowledge there is no text which treats the subject of root canal therapy so thoroughly. The fact that the subject is highly controversial and one in which the material has been so widely scattered makes this treatise most valuable. The author has gathered together the pros and cons and balanced them in an intelligent and scientific manner.

Normal tissue arrangements, followed by the succession of pathological deviation arising from disease is presented in a most concise way by Dr. Coolidge. His treatment of the health and hygiene of the soft tissues of the periodontium leading into the periodontal unit is well executed.

The book is beautifully illustrated with reproductions of didactic photomicrographs and roentgen rays. A supporting bibliography is carried throughout the text. As a book for constant reference, *Clinical Pathology and Treatment of the Dental Pulp and Periodontal Tissues* should be in every dental library.

J. RUE PLATER.

• SOCIETY BULLETINS •

HOWARD M. MARJERISON NEW DEAN OF ILLINOIS

University of Illinois officials recently announced the appointment of Dr. Howard M. Marjerison to succeed Dr. Frederick B. Noyes as Dean of the University of Illinois College of Dentistry. Dr. Marjerison, Dean of Tufts College Dental School for the last six years, is a nationally known leader in dental education and has been credited with developing Tufts Dental School into one of the finest in the East.

Dr. Marjerison was graduated from Tufts College in 1916 receiving the degree of Doctor of Dental Medicine. After spending a year at Forsyth Dental Infirmary for Children, he joined the staff of Tufts Dental School as an instructor in prosthetic dentistry. He became Acting Dean of his school in 1933 and Dean in 1934. Judging from his published papers, Dr. Marjerison will follow the example of Retiring Dean Noyes in maintaining a high standard of dental education at Illinois.

Dr. Marjerison has been active in the following academic and professional organizations: National Board of Dental Examiners, American Academy of Dental Science, Forsyth Dental Infirmary for Children, The Robert R. Andrews Honorary Society, the International Association for Dental Research, the Guild of St. Apollonia, as well as the American Dental Association and affiliated societies. The Illinois State Dental Society is pleased to welcome Dr. Marjerison into the field of dental education in Illinois.

Retiring Dean Noyes came to the University of Illinois College of Dentistry as Professor of Histology and Orthodontia in 1913 and for the past fourteen years has been Dean of the College. He was very successful as Dean and was active in planning and arranging for the College's beautiful new dental building. He has gained the respect of dental educators everywhere and is well known in organized dentistry.

Maynard K. Hine,
Associate Editor.

ROCK ISLAND

A testimonial dinner was tendered John W. Gluesing, on the occasion of his having completed 50 years of active practice in Moline, by the Rock Island Dental Society, April 23. About 75 were present, including many friends outside the profession. Ben Sherrard added much dignity to the event by serving as toastmaster. Mr. Stephen Albrecht reminisced in an interesting manner on his lifelong friendship with Dr. Gluesing. Miss Georgia First lauded the guest of honor for his many sterling qualities as a dentist and citizen. Charles Leigh of Davenport and J. H. Nichols of Rock Island presented the good wishes and felicitations of the dentists in their respective towns. H. A. Ziegler, representing the Rock Island Society, presented Dr. Gluesing with an engraved gold key in token of his 50 years of service to the community. The entire party was both fitting and enjoyable.

The many colleagues of Dr. Gluesing in Illinois will be interested in the following brief sketch of his career.

John William Gluesing, born in Moline, September 22, 1868, received his early education in the Moline public schools and the Davenport Business College. He worked for Uncle Sam as a mail clerk in the Moline Post Office for a year before entering the University of Iowa Dental School from which he was graduated in 1890. Following this he served for two years as assistant to Dr. J. B. Morgan of Davenport. In 1892 he opened an office in the Skinner Building, where he practiced until the business district moved to 5th Avenue. When the Reliance Building was completed in 1913 he removed to that building where he has practiced since. During the administration of the late Governor Small he was appointed to the State Board of Dental Examiners, an office he held for eight consecutive years. Dr. Gluesing first joined the ranks of organized dentistry in 1893 and became a life member of the State Society in 1930. His hobbies are hunting

and fishing but the great interest of his life has always been his profession.

"Clinical and Experimental Factors in the Eruption of Teeth," was the subject of the lecture given by Dr. Isaac Schour of the Department of Histology, University of Illinois College of Dentistry, before the regular meeting of the Rock Island District Dental Society, Tuesday evening, April 16, at the LeClaire Hotel, Moline. Thanks to Dr. M. J. Nelson for substituting for your editor. He reports that Dr. Schour discussed all the aspects of tooth eruption. Most important was that on calcification which exploded the theory practiced by so many dentists, viz.: the prescribing of calcium in various forms to adult patients who are suffering from extensive dental caries with the expectation that its intake will prevent further decay. Dr. Schour said, "Calcium *alone* is of no benefit in the forming of teeth but calcium administered to children by means of a well balanced diet is of untold value, because calcium when once deposited in the teeth can never be taken out."

The next regular meeting of the society will be an all day outing in Aledo. There will be prizes for all sports events and a dinner served to the members in the evening. M. D. Guy, M. M. Marquis, D. T. Marquis and G. L. David will be hosts for the day.

Sidney A. Wiggins,
Component Editor.

* * *

PEORIA

The Local Talent meeting down our way was a great success. The following table clinics were given during the afternoon: Cast One Piece Bridge, Spiro's Technique, B. A. Shepherd; Treatment of Deciduous Teeth, W. R. Rodenhouser; Gold Foil, W. M. Peters; Porcelain Inlays, W. L. Bayne; Fournet-Tuller Lower Impression Technique, W. E. Nolting; Children's Dentistry, O. S. Hoag; Hydro-colloid Impression Materials, J. R. Powers; Prosthetic Dentistry, A. H. Chenoweth. . . In the evening J. F. Herman gave a highly informative paper on "Infections of Dental Origin," which was followed by movies taken at last years picnic. . . Election of officers closed the session and as Bill Hay of Amos and Andy says, "Here they are": President, L. F. Tinthoff, Peoria; Vice President, Lew Wallace, Roanoke; Secretary, Wallace Peters, Peoria; Treasurer, S. S. Ferdinand, Peoria; Librarian, W. A. Johnston, Peoria; President-elect, C. B. Clarno, Peoria; Governors, three, two and one year terms respectively, E. E. Hoag, Peoria; S. B. La Due, Chillicothe; and B. E. Shepherd, Morton.

Holding offices in luncheon clubs still seems to be a habit with Peoria fellows. J. W. Weidner has just been elected vice president of the Optomist Club. Judging from the way he looked into the newscamera, J. W. seemed quite happy about it all. . . L. L. Strong has moved into his new quarters at 812 Alliance Life Building. Lawrence hasn't had an official opening as yet, but I'm sure he'll be glad to show the boys around. . . Found Verne Moore wandering around the halls, guess the Lehman Building wasn't big enough for him to get in all the training necessary to prepare him for the golf season.

We have been asked to make the following announcement: the Annual Picnic will be held Thursday, June 27 at Shore Acres. There will be golf, swimming, trapshooting and baseball. While there is no mention of *eats* we trust it is just an oversight, so better save the date.

E. H. Mahle,
Component Editor.

* * *

CHAMPAIGN-DANVILLE

Champaign-Danville elected officers and appointed committees for the ensuing year at their last meeting as follows: President, L. G. McMillan; Vice President, C. F. Hausserman; Secretary-Treasurer, G. W. Akerly; Librarian, E. E. Ebert; Program—Foster, Daily, Gauerke, Johnson, Hamm; Membership—Ebert, McCann, Myers; Red Cross—Rose, Martin; Local Arrangements—Hausserman, Higgason, Stevens, Brown; Censorship—Newlin, Dunn, Barker; Relief Fund—Ross, Hindman; Component Editors—Vaught, Wise.

G. W. Akerly,
Secretary.

Table Clinics Galore—May 16

EASTERN ILLINOIS

Spring! Beautiful Spring! A lovely snowstorm marked the day of our *Spring* meeting held in Paris on April 11. The weather undoubtedly interfered with our attendance but many of the boys traveled quite a distance regardless. . . Dr. Maynard Hine was the speaker, his subject "Periodontia and Diseases of the Mouth." Many points suitable for every day practice were culled from the lecture. Dr. Hine also showed some x-ray films of unusual cases. . . . A business session with election of officers followed. Officers for the coming year are: President, E. D. Cretors, Paris; Vice President, Herrick Baughman, Mattoon; Secretary, M. F. Lossman, Tuscola; Treasurer, John Phillips, Arcola. . . Berlau, Wright, Maddock and Williams were reinstated. . . The treasurer's report showed an excessive amount of money so it was decided to buy another bond. Who says there is no money in dentistry? . . . A delicious turkey dinner was served. Yes, it was actually turkey and we were not trying to be the first to celebrate Thanksgiving Day for 1940. We just like turkey.

We don't have another meeting until September so I am depending on you members to supply me with the necessary "chit chat" for this column. Don't let me down!

M. F. Lossman,
Component Editor.

* * *

T. L. GILMER

Dr. A. F. Romnes of Northwestern University Dental School was the scheduled speaker of the Quincy Study Club Tuesday afternoon and evening, April 9. Dr. Romnes' excellent lecture on amalgams was enjoyed by the forty-two dentists who attended the meeting. Technicolor movies further emphasized the proper manipulation of amalgams.

Several members of the T. L. Gilmer Society are planning on attending the State Meeting in Springfield in May. . . H. R. Farwell has moved to a new suite of offices on the third floor of the Illinois State Bank Building in Quincy. . . H. F. Nauman says that although his wife is still a patient in Blessing Hopital, she is convalescing nicely from a hip fracture. . . Julius Seidell spent Sunday, April 21 in Decatur studying map problems for the Army maneuvers scheduled in the fall. . . Hugh Tarpley enjoyed a several days visit with his mother in Spartansburg, South Carolina. Hugh was recently appointed chairman of the Dental Education Committee for the T. L. Gilmer Society.

Several men have taken advantage of the occasional spring weather and are enjoying golf at the various courses throughout the city. Among those seen at different times were Ownby of Mendon, Schauf, Busbey, Haller, Sohm, Tarpley and L. M. Wolfe of Quincy, and Bob Crooks of the Schmitt Dental Laboratories. . . James Haffner attended the Cardinal-Pirate game on opening day in St. Louis. . . L. H. Wolfe has been trap and skeet shooting in Hannibal and Quincy several Sunday and Thursday afternoons. . . Roy Thesen spent two days in Chicago attending the annual Homecoming Clinic of the Chicago College of Dental Surgery. . . K. I. Grimes received the Consistory Masonic Degrees during a recent reunion and was also elected president of the class. Other dentists seen at the reunion were Jackson of Macomb; Hamman of Rushville; Nauman, King, L. H. Wolfe, Busbey and Mueller of Quincy.

L. M. Wolfe,
Component Editor.

* * *

DECATUR

And so that is that—referring, of course, to our last meeting of the year. Probably one of the most succesful years that we have ever had. No year, however, could be a poor one with Lloyd Dodd as Program Chairman and a responsive close knit membership to work with. . . Conspicuous among those absent from this last meeting was A. C. (Alternating Current) Stiles. Maybe he was just a little down in the mouth, however, for when a fellow reaches the stage in his profession that A. C. has, only to have his own classmates refer to him as "The Graduate Student," he has a right to feel pretty low. . . The program for the evening, among other things, was the stunt show with cash awards for the best ones. Jim Laswell seemed to have first prize

cinched with his paper on "Problems of the Third Molar" until he expressed the opinion that these pesky things might have something to do with these miraculous conceptions we often hear about. That remark caused him to be voted clear out of the hall. . . Now, boys and girls, here's a tip on how to get an executive position in your dental society. Stay away the night of election. Brother Watters of Bethany wasn't there, so he was elected President. Paul Berryhill stepped out of the room for a moment (we won't state where he went) but when he got back he was the Vice President. We couldn't get Campbell out of the room so we just put him back as Secretary right in front of his face. A. C. Stiles, being absent, was made Librarian with an increase in salary. It was voted unanimously to select another Component Editor for the coming year. . . So there you are folks, and we expect to see all of you at our picnic, the date and place of which will be announced later.

H. H. Foster,
Component Editor.

* * *

KNOX

Dr. G. R. Lundquist of the Department of Oral Pathology of Northwestern University gave a most interesting lecture on the treatment of Pyorrhea at the regular monthly meeting of the Knox County Dental Society, held Wednesday, April 24. . . A sumptious steak dinner was served at the Galesburg Club before the meeting. Dr. Lundquist further enhanced the value of his talk by showing colored films of the three techniques he uses. . . Dr. W. E. Laederach accompanied Dr. Lundquist to the meeting. . . We were very happy to welcome several visitors from Avon and Alexis. . . Proudly we announce that well over 50 per cent of our members turned out for the meeting.

M. W. Olson,
Component Editor.

* * *

G. V. BLACK

The April meeting of the G. V. Black District Dental Society was held at the Hotel Abraham Lincoln in Springfield the afternoon and evening of April 11. About 150 members and guests turned out to hear Dr. Rudolph O. Schlosser, Professor of Prosthetics, Northwestern University Dental School, give a most practical and enlightening talk on dentures. He demonstrated all the steps in immediate denture construction from the snap impression to the finished dentures delivered to the patient the same day. Processing in acrylic resin, rebasing of old dentures and quick repair of dentures were included in the demonstrations.

News About Members: R. R. Blanchard became a Life member this year so we will expect him to look dignified in the future as becomes one who has spent 25 years in the profession. . . We understand our friends Edward Jordan and Henry Parry Robinson have formed a partnership to furnish dental services—especially bridge work—to the inmates of the city jail. . . George Carruthers has left the quiet section of town known as the First National Bank Building to enter that swirling commercial vortex, the Illinois Building. Best wishes, George! . . . Howard S. Layman was recently elected president of the Alumnae Association of Washington University Dental School. (Oh, yes, Dr. B. B. Beatty, you have heard of that school). Howard well deserved the honor. . . The "Follies" given by the Springfield Service League on April 16 was a great success both from an entertainment and a financial point of view. The operation of the School Clinic is now assured for another year. All local talent was used and was it good! Mickey Rooney in "Young Tom Edison" and Harold Maxey (Springfield's gift to the movies) in the "Dental Clinic" were presented for the three days preceding the Follies. I must say, Harold, that you made by far the best looking actor. . . Next month we will welcome everyone to our fair city of Springfield when Les Lambert stages the annual show, the State Meeting. Les and his committee have worked hard for this meeting and they all deserve our appreciation. . . Our next meeting will be held in Jacksonville, June 13. The Jacksonville boys promise to put on a real one and we know they will keep their promise.

Ed Ratliff,
Component Editor.

CHICAGO

The April meeting of the Chicago Dental Society was held as usual at the Stevens on the 19th. Harold Hayes presented Johnny Behr, coach of the Chicago Golden Gloves team, as the dinner speaker. Mr. Behr proved to be an unassuming gentleman with a gift for apt description and, among other things, explained just why it was that the American team could no more than break even in the International Golden Gloves contest. Many of the European boxers, he said, are able to maintain their amateur status for years. There is no inducement over there to turn professional. Some of them engage in as many as two or three hundred bouts, while the American boys are lucky to get even a dozen. So if experience counts for anything the boys from Europe should register a grand slam. (Interpret that anyway you want to). A large and, for the most part, enthusiastic audience listened to the symposium on Oral Surgery, with rapt attention. They later overflowed into the anteroom of the North Ballroom to make themselves and the clinicians uncomfortable for lack of space. The same number of people that fill the ballroom to capacity to listen to the essayists are later forced to convene to watch the table clinics in a room half its size; simple mathematics proves that it can't be done. But, unlike the Republican candidate who upbraids the New Deal without offering some better course, your correspondent has a solution to propose. Hold the table clinics in the South Ballroom. There is plenty of time after the dinner to get the room ready and everyone will be happy. Earle Thomas headed the imposing array of essayists who took part in the symposium on Oral Surgery. Covering the whole subject, "Infections Involving the Maxillary Sinus," in 23 minutes would appear, at first glance, to be an impossible feat. Books have been written about them. Yet Earle actually expatiated on all the salient points. Fred Molt was the second speaker of the evening, and as is his wont, read an excellent paper on "Diagnosis, including the Interpretation of Radiographs." The only criticism that can be offered is that he didn't stick to his subject. He kept calling them Roentgenograms! In the main everyone agreed with the general thesis of Ralston Lewis' "Post-Operative Management," but when he made the rather bold statement that he advocated the use of "Arli," that famous snake-bite remedy, (good for everything from chilblains to dandruff) as a mouthwash, someone in the room near us fainted dead away. Carroll Stuart is at his best when he doesn't confine himself to the limits of his paper. His extemporaneous remarks, including some once-in-a-lifetime case histories concerning "Acute Infections of the Jaws," certainly intrigued his audience. And as the final speaker Howard Miller gave a clear, concise résumé of "Mouth Preparation for Dentures." His technique, if followed, will practically guarantee that you'll have satisfied patients. Following the symposium a group of table clinics was put on by members of the Chicago Society of Oral Surgeons. These were apparently very interesting for it was past midnight before the lights went out. . . Most everyone knows of the new psychology epitomized by Dale Carnegie in his book, "How to Win Friends and Influence People," but few know of the new psychology emanating from "America's No. 1 Salesman," Elmer Wheeler. Mr. Wheeler will be the guest of the Chicago Dental Society at its May meeting, and will endeavor to tell his audience how to win patients and influence them to buy more (and better) dentistry. As this will be the final meeting of the season the new officers will be appropriately installed by President Harold Welch.

J. H. Keith,
Component Editor.

* * *

CHICAGO DENTAL ASSISTANTS' ASSOCIATION

Twenty members and guests attended the recent clinic conducted by Dr. Sidney S. Pollack. Dr. Pollack gave a practical demonstration on the taking of facial impressions for masks in both plaster and colloid materials. We wish to express our sincere thanks to Dr. Pollack for a very valuable and interesting evening. . . The first State Meeting of the Illinois State Dental Assistants' Association will be held in Springfield

on Sunday, May 12. . , Our last meeting of the season will be held at the Stevens Hotel, Thursday, May 16 for paid members only. The annual election of officers and initiation of new members will be held.

Grace A. Olsen,
Publicity Chairman.

* * *

ILLINOIS DENTAL ASSISTANTS' ASSOCIATION

Miss Katherine Hastings will preside at the first official meeting of the Illinois State Dental Assistants' Association which will be held in Springfield on Sunday, May 12.

PROGRAM

9:30 A. M.—Registration, Parlor K.

10:00 A. M.—Business Meeting.

12:00 A. M.—Luncheon, Palm Room. Send reservations to Mrs. Ethel Sieverns, Illinois Building, Springfield.

1:30 P. M.—Open meeting for all dental assistants.

2:30 P. M.—Clinics:
"Suggestions for Practice Building and Helpful Hints," Betty Drennan, Chicago.
"X-ray," Frances Gaa, Springfield.

3:30 P. M.—Professor Quiz Program—A novelty arranged by Springfield dentists.

4:00 P. M.—Tea, Palm Room. All assistants and members of the dental profession invited.

Miss Hastings was the invited guest of the Wisconsin State Dental Assistants' Association last month. She was presented with a shiny green handled gavel, appropriately inscribed in silver, as a gift from their organization to ours. In response, Miss Hastings presented our Wisconsin sisters with a table standard American Flag. . . We commend the many girls who had a hand in organizing our new State Association, but to Nancy Saunders and Katherine Carr we give an extra large and beautiful orchid.

Ruth Marsh,
Publicity Chairman.

N.U.D.S. ALUMNI REUNION CLINIC AND GOLF DAY

Northwestern University Dental School Alumni Association will hold its Annual Homecoming Clinic and Golf Day on June 12 and 13. Wednesday, June 12 will be spent in the Ward Memorial Building, 311 East Chicago Avenue, from 9:00 A. M. to 5:00 P. M.

George W. Teuscher,
Secretary-Treasurer.

* * *

ANNUAL OUTING U.I.C.D. ALUMNI

The Annual Alumni Outing of the Alumni Association of the University of Illinois College of Dentistry will be held Wednesday, June 5, at the Itasca Country Club. The classes of 1900, 1910, 1920 and 1930 will be honored and the members of the class of 1940 will be guests. . . Ralph Wishneff, general chairman of the Outing, will be assisted by Paul Wilcox, Pete Wlodkowski and Carl Brasmer.

M. K. Hine,
Secretary.

* * *

DENTISTS INVITED TO ST. JOHN'S SANITARIUM

Dr. Robert K. Campbell, Medical Director of St. John's Sanitarium, located some three miles east of Springfield, has extended a cordial invitation to the members of the Illinois State Dental Society to visit the Sanitarium during their annual meeting.

J. Leslie Lambert, Chairman
Committee on Local Arrangements.

* * *

AMERICAN RED CROSS

At the request of the Surgeon General of the Army and in compliance with its policy of cooperation with both the Army and Navy, the American Red Cross, as an expansion of its peace time service for the military forces, has undertaken the enrollment of various types of medical technologists who are willing to serve in the Medical Department of the Army or Navy if and when their services are required at the time of a national emergency.

Persons with the following qualifications will be enrolled:

Chemical Laboratory Technicians (male)
Dental Hygienists (male and female)
Dental Mechanics (male)

Dietitians (male and female)
Laboratory Technicians (male and fe- (male)
Meat and Dairy Hygienists (Inspectors) (male)
*Nurses (male)
Occupational Therapy Aides (male and female)
Orthopedic Mechanics (male)
Pharmacy Technicians (male and female)
Physical Therapy Technicians (Aides) (male and female)
Statistical Clerks (male and female)
X-Ray Technicians (male and female)

*This group will not be members of the Army or Navy Nurse Corps which under basic law are limited to females, but will be used as technologists for service auxiliary thereto.

General qualifications for enrollment are as follows:

1. Citizens of the United States.
2. Ages 21-45 years (Army); 18-35 (Navy—men only)
3. Physically qualified. Applicants must pass a satisfactory physical examination, according to standards set respectively by the Army and Navy Medical Departments.
4. Women applicants must be unmarried.
5. All applicants must express a willingness to serve as a technologist in time of a national emergency.

Male technologists will be eligible for enlistment in the Army as non-commissioned officers in the grades of sergeant, staff sergeant, or technical sergeant. Women technologists, and men who enroll but who may later be found physically unqualified for military duty, will be eligible for employment by the Army as civilians.

For the Navy, male technologists will be eligible for enlistment in the Naval Reserve as Petty Officers—Pharmacist's Mates, 3d, 2nd and 1st class and Chief Pharmacist's Mate (acting appointment). Women technologists are not eligible for service in the Navy under present plans.

The Medical Department of the Army will require a considerable number of technologists in each of the above named groups. The Navy Medical Department requirements will be similar except for dietitians, occupational therapy aides, orthopedic mechanics and dairy and food hygienists (inspectors) who will not be needed. Notwithstanding the maintenance of this enrollment, the Navy also desires peace time enlistment in the U. S. Naval Reserve, and male technologists who wish to enlist in the Naval Reserve are urged to communicate direct with the Commandant of the Naval District in which they reside. The address of their Commandant will be furnished upon request.

Technologists who qualify according to these general standards and who are willing to enroll for service as outlined above, should communicate with The American National Red Cross, Washington, D. C.

This statement was prepared by the American Red Cross and has the approval of the National Defense Committee of the American Dental Association.

C. Willard Camalier, Chairman.

* * *

PULP INVOLVED TEETH

(Concluded from Page 177)

to the pulp involved teeth as a focus of infection.

5. Vitality tests do not coincide with either roentgenographic or bacteriologic findings.

Ann Arbor, Michigan.

76th Annual

STATE MEETING

SPRINGFIELD

May 13, 14, 15, 16

•

ABRAHAM LINCOLN HOTEL

• OBITUARIES •

GEORGE B. WINTER
1878—1940

Dr. George B. Winter, a world renowned figure in dentistry, died at his home in St. Louis, March 28.

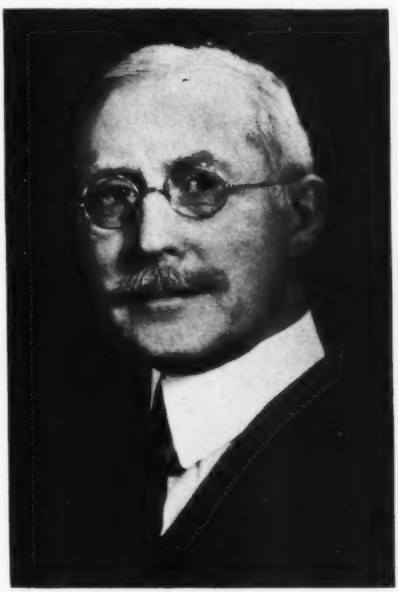
Dr. Winter's fame came from research and teaching in the field of oral surgery, especially in that phase which deals with removing impacted teeth. He spent some years studying various methods of extraction after which he evolved a more satisfactory basis for tooth movement during their removal. His book, published in 1913 was the first comprehensive treatise on the subject and became the leading textbook in its field. He later became interested in improving the technique for removal of impacted third molars which soon revolutionized this phase of dental surgery. His book, "Impacted Mandibular Third Molars," became a classic on the subject.

Dr. Winter was a past President of the American Dental Association, Professor of Exodontia, at St. Louis University and Washington University School of Dentistry. He also taught at Columbia University, Guys Hospital, London, England, and the American Hospital, Neuilly, France.

He received the following honors: the Newell Sill Jenkin medal for outstanding contributions to dental science 1933; gold medal and scroll from the Rhode Island State Dental Society for outstanding research, 1936; gold medal from the Odontological Society of Havana, Cuba, 1938. He was an honorary member of the American Dental Society of Europe, the American Dental Society of the Argentine Republic, Sociedad Odontologica Cubana, Sociedad Odontologica de Chile, La Sociedad Odontolojica de Valparaiso, Academia de Estomatologica del Peru, Centro de Odontologica de Uruguay, Associacion Odontologica de Chile, Ohio State Dental Society, Oregon State Dental Society, Oral Surgery Section, Second District Dental Society of New York, and Omicron Kappa Upsilon, honorary dental fraternity.

He was born in Brooklyn, New York, April 14, 1878. His early education was received in the Brooklyn public schools. He was graduated from St. Louis University in 1900 with a degree of D.D.S. He is survived by his wife, Josephine Porter Winter, and two daughters, Josephine and Jane Winter.

The Illinois State Dental Society mourns the passing of Dr. Winter and joins with the rest of the dental world in paying tribute to his life of service. His contributions to dentistry have secured for him a place among the great of our profession.



WILLIAM H. WEST
1859—1939

Dr. William H. West passed away at his home in Evanston on December 10, 1939. He was 80 years old, having been born in

Hollidaysburg, Pennsylvania, November 24, 1859.

In 1883 Dr. West graduated from the Pennsylvania College of Dental Surgery and immediately came to Chicago where he practiced actively for 50 years. After retirement in 1933, Dr. West devoted the greater part of his time to his hobby which was the cultivating of many varieties of roses.

He joined the Illinois State Dental Society in 1905 becoming a Life Member in 1930. In 1934 he retired from active membership in the Society, but remained a Retired Life Member. Surviving Dr. West are his widow, one son, one daughter and six grandchildren.

JOHN EMANUEL AIGLEY
1862—1940

After practicing dentistry for nearly 50 years Dr. John Emanuel Aigley died at his home in Farmington on February 20. He had been ill for some time.

Dr. Aigley was born in Lena, February 4, 1862. He attended Beloit College and was graduated from the Chicago College of Dental Surgery in 1896. He began his practice in Farmington and continued there until his health failed. On February 27, 1911 he married Estella Crane.

He was a Life Member of the Society and had always taken an active part in society work. He served as president of his local society in 1914.

Dr. Aigley was a member of the English Lutheran church. He was also affiliated with the Masonic order and had held many offices in the Order. Always active in civic affairs, Dr. Aigley was president of the Board of Education of Farmington for many years and served on the Public Library Board for more than 30 years. He was president at the time of his death. He was one of the founders of the Farmington Loan Association and had been its president since its establishment in 1916.

FRED W. DAINS
1887—1940

Death came to Dr. Fred W. Dains on February 11 at the Veteran's Hospital in St. Louis. He was 52 years old and had practiced dentistry since 1914.

He was born near Ava, December 7, 1887 the son of Mr. and Mrs. Levi Dains. He was educated at St. Louis University and was graduated from the School of Dentistry in 1914.

Dr. Dains was one of the first to enlist in the Army in 1917. Shortly after his enlistment he was promoted to the rank of captain in the Army Dental Corps. He was stationed at Little Rock, Arkansas during his training period and afterward saw 11 months active service in France. Dr. Dains was a charter member of the Roger Taft Post of the American Legion and remained a member until his death. For some years he served as commander of the Post.

He first entered the practice of his profession in Willisville, and except for the time he was in service remained there until 1925. He moved to Percy at that time and practiced there until his death. He was secretary of the Southern Illinois Dental Society for many years.

Dr. Dains was a member of the First Baptist church and served on its board of trustees.

He was united in marriage to Hattie Darrington in 1916. He is survived by his wife, two sons, Thomas Edward, and Fred Wilson, both of Percy; and four brothers and two sisters.

CEYLON ROSSMAN
1868—1938

Death came to Dr. Ceylon Rossman on August 17, 1939. He was born in Fondulac, Wisconsin, September 1, 1868.

Dr. Rossman was graduated from the Chicago College of Dental Surgery in 1894. He started practice in LaGrange, but was forced to abandon it for several years due to ill health. In 1916 he opened an office in Hinsdale and practiced there for 18 years. He joined the Society in 1913 and became a Life Member in 1937. He was very active in civic affairs in his community. In 1934 he gave up his practice due to severe x-ray burns and the amputation of his leg. He made his home with his daughter in Oak Park the last few years.

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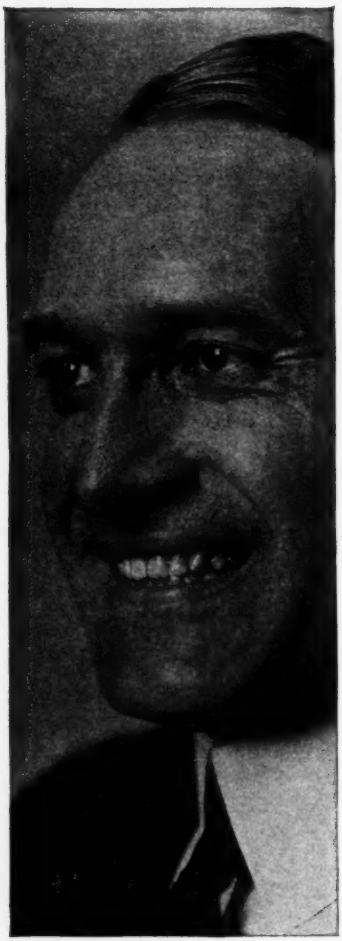

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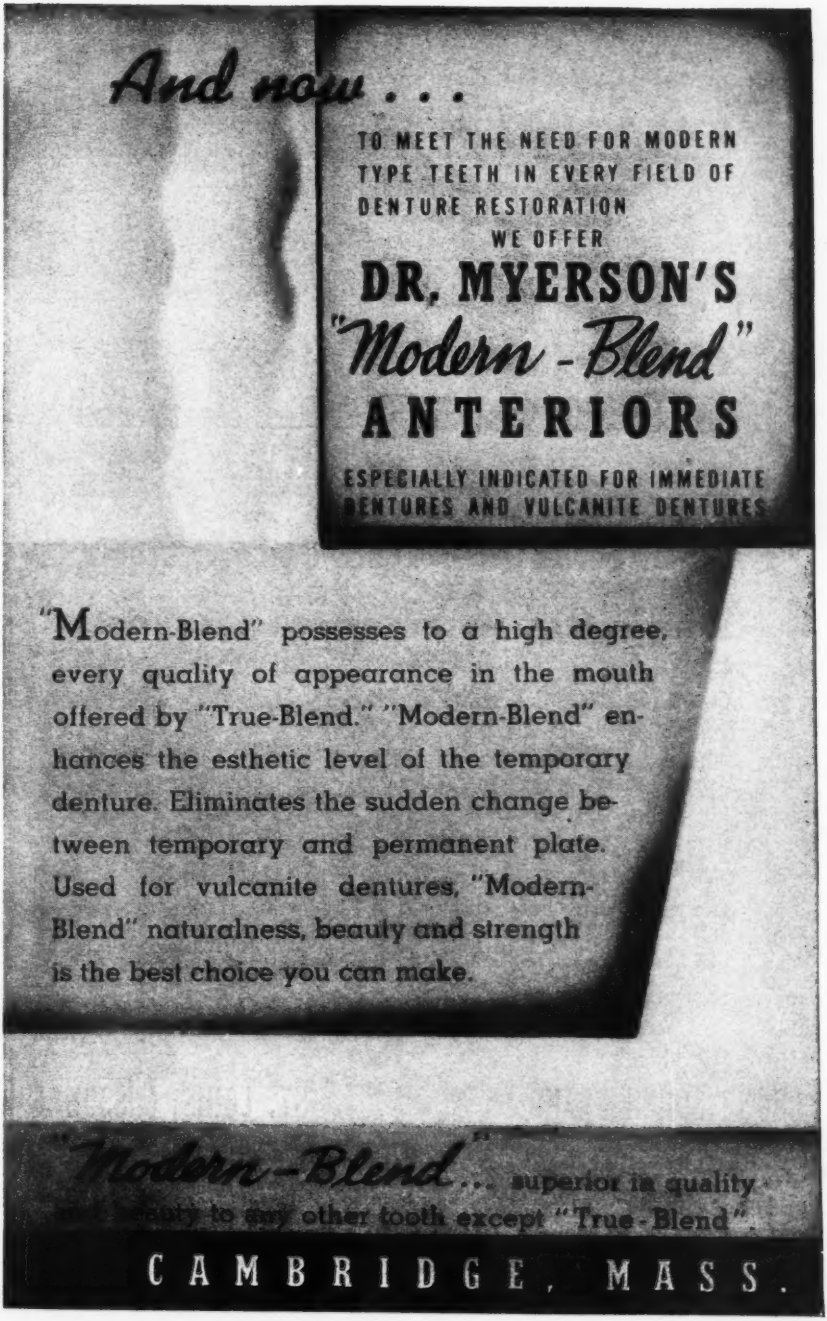
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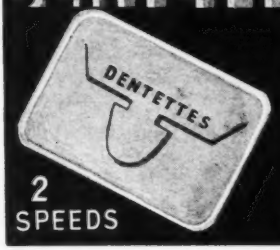

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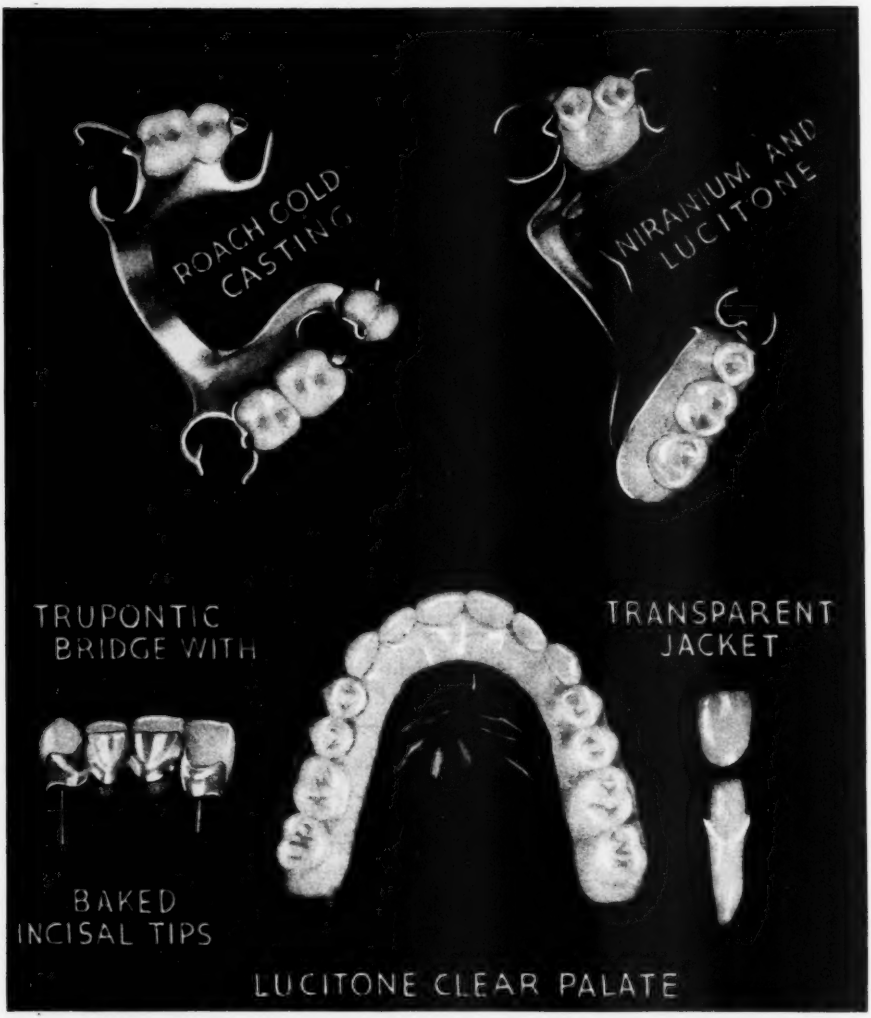

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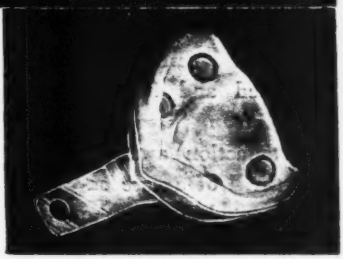

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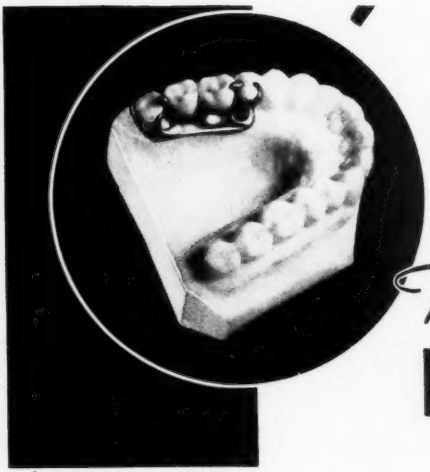

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